

INSTRUCTION

FOR

FIELD ARTILLERY,

EXTRACTED FROM

GILHAM'S MANUAL

FOR

1572

VOLUNTEERS AND MILITIA.


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LIGHT ARTILLERY TACTICS.

SCHOOL OF THE PIECE.

633. Light artillerymen should, before receiving instruction in their duties at the piece, be familiar with the first part of the school of the soldier, as laid down in Infantry Tactics, and with the Manual of the Sabre, No. 440, and following. If intended for horse artillerymen, they should also be instructed in the duties of the trooper, No. 382, and following.

The drivers—one to every pair of horses—should have experience in the management of horses in harness.

634. The cannoneers of a piece, when united, constitute a *gun detachment*, which is composed ordinarily of nine men in mounted artillery, and eleven in horse artillery; two of whom—the gunner who commands the detachment, and the chief of caisson—should be corporals.

The detachment is formed by the gunner, who causes the cannoneers to form in two ranks, eighteen inches between them, elbows slightly turning. He tells the detachment off from the right, No. 1 being on the right of the rear rank, No. 2 on the right of the front rank, No. 3 on the left of No. 1, No. 4 on the left of No. 2, and so on, the even numbers being in the front, and the odd numbers in the rear rank. The chief of caisson is told off as No. 8. When the detachment is composed of more or less than eight men, the chief of caisson should be the highest even number. When the detachment, from any cause, consists of less than nine men, the higher numbers are left out, and additional duties are imposed upon the cannoneers present.

When the chief of the piece, who should be a sergeant, is present, and is not acting as the instructor, he performs the duties, and takes the position of the gunner, who then takes post one yard in rear of the right file, and acts as file-closer, except when the chief of piece is out of ranks, when he resumes his post.

For purposes of instruction, each detachment should be halted in front of and facing the piece, the latter being unlimbered, and the different numbers called upon successively, to perform their respective duties *in detail*, while the rest of the detachment are required to attend to the instruction, and to the manner in which the motions are performed.

Posts of the cannoneers. Piece unlimbered.

635. The gunner is at the end of the trail handspike; Nos. 1 and 2 are about two feet outside the wheels, No. 1 on the right, and No. 2 on the left: with howitzers, they are rather in rear of the muzzle; with guns, in line with the front part of the wheels. Nos. 3 and 4 are in line with the knob of the cascable, covering Nos. 1 and 2; No. 5 five yards in rear of the left wheel; No. 6 in rear of the limber, which is turned about so as to face toward the piece, (see No. 29); and No. 7 on his left, covering No. 5; No. 8, the chief of the caisson, is four yards in rear of the limber, and on its left; all face to the left, which is the direction in which the muzzle of the piece is pointing.

The chief of the piece is opposite the middle of the trail handspike, outside of, and near the left cannoneers. In actual firing, he places himself where he can best observe the effect of the shot.

Loading and firing.

636. The piece is supposed to be on the drill ground, unlimbered, and ready for action; the limber is in position behind the piece, and facing toward it, the end of the pole six yards from the end of the trail handspike; and the detachment in front of and facing the piece.

Before commencing the individual instruction of the cannoneers, the instructor should enter into an explanation of the different kinds of field guns, their names, and the names and uses of the

different parts of the gun and carriage before them. This done he commences the instruction with the gunner, who commands and points the piece in action.

637. *Commanding and pointing.*—The gunner is responsible for the manner in which the numbers discharge their duty. He communicates the orders which he receives for the kind of ammunition to be fired; sending to No. 6, (who is charged with preparing the fuze,) the time of flight or the distance for each round, when firing shells or spherical case shot. He should, when the firing is slow, see that each fuze is properly prepared, and make such corrections as are necessary; for this purpose, he, as well as No. 6, should be provided with a fuze-gouge.

On receiving the command, or signal to commence firing, he gives the command *load*; takes hold of the handspike at the end with the right hand, and at the centre with the left; places his left knee against the left hand, bending over it, the right knee being slightly bent; looks over the top of the piece, and gives the direction. He then steps to the breech to give the elevation, which he does by placing the hausse (see No. 665) on its seat, taking hold of a handle of the elevating screw, drawing back his right foot, bending over his left knee, and sighting through the slit in the hausse.

When the piece is loaded and pointed, he removes the hausse, gives the command *ready*, and stepping clear of the wheel to that side where he can best observe the effect of his shot, gives the command *fire*. As soon as the piece has been fired, he causes it to be run up to its former place, if the recoil has made it necessary.

When the instructor, instead of giving the command *commence firing*, gives that of *load*, the gunner repeats it, and performs the same duties as before, except that he does not command *fire* until the firing is ordered to commence. After the command to *commence firing* is given, the action is continued by the gunners without further command from the instructor, until the firing is ordered to cease. When the commands are all given by the instructor, as in loading by detail, the gunner performs the same duties, but without repeating the commands.

638. *Sponging and ramming.*—Until the command *load*, No. 1 stands faced to the front, in line with the front of the wheels, hold

ing the sponge about the middle of the staff in his right hand, and trailing it at an angle of 45° , sponge head up.

The instructor commands:

By detail—LOAD.

Three pauses and four motions..

First motion. At the command *load*, No. 1 faces to the left, steps obliquely to the right with his right foot, without moving his left, and at the same time brings the sponge to a perpendicular position, by drawing his right hand up in line with the elbow. The sponge is grasped firmly in the hand, the rammer head held over the right toe, and the elbow kept close to the side.

Second motion. He steps obliquely to the left with his left foot, planting it about half-way between the piece and the wheel, and opposite the muzzle, bringing the sponge at the same time across his body to the left, so that his right hand may be opposite the middle of the body, the sponge staff being inclined at an angle of 45° across the front of it.

Third motion. He takes a side step to the right of thirty inches with the right foot, and bending the right knee, brings the sponge to a horizontal position, extending the hands to the ends of the staff, the sponge head to the left, the back of the right hand up, and that of his left down, the sponge head pressing against the face of the piece.

Fourth motion. He inserts the sponge head, drops his left hand behind his thigh, shoulders square, feet equally turned out, straightens the right knee, bends the left, and, leaning over it, forces the sponge home.

SPONGE.

Three pauses and four motions.

First motion. At the command *sponge*, No. 1 fixes his eye on the vent to see that it is closed, gives two turns to the sponge, pressing it at the same time against the bottom of the bore.

Second motion. He draws out the sponge, at the same time straightening his left knee and bending his right, seizes the staff

near the sponge head with his left hand, back of the hand down, and places the sponge against the face of the piece.

Third motion. He turns the sponge by bringing his hands together in the middle of the staff, giving a cant with each hand, throwing the sponge head over, at the same time turning his wrists, so as to bring the staff to a horizontal position; he then extends his hands to the ends of the staff, the back of the left up, that of the right down.

During the whole time of sponging, No. 1 keeps his eye on the vent. If at any time it is not closed, he will discontinue the manœuvre, and command, *stop vent*.

Fourth motion. He introduces the rammer head into the muzzle as soon as No. 2 has inserted the charge, and joins his left hand to his right, casting his eyes to the front.

RAM.

Two pauses and three motions.

First motion. At the command *ram*, No. 1 rams home, throwing the weight of his body with the rammer; bending over his left knee, and passing his left arm, with the elbow slightly bent, and back of the hand up, in a horizontal position over the knee, until it points in the direction of the left trunnion; the right shoulder thrown back, and the eyes cast toward the front until the cartridge is home.

Second motion. He jerks the sponge out with his right hand, allowing it to slide through the hand as far as the middle of the staff, when he grasps it firmly, and seizing it close to the rammer head with the left hand, back of the hand up, places the rammer hand against the face of the piece, straightens his left knee and stands erect; eyes to his own front.

Third motion. He then draws the sponge close to his body, and immediately steps back outside the wheel, first with the right, then with the left foot; so that when the right foot is brought to it, the right hip may be on a line with the front of the wheel. In drawing the right foot to the left, he gives the sponge a cant with his left hand, at the same time quitting it, and brings the sponge to a

perpendicular position in the right hand, the rammer head resting on the right toe.

Ready. At this command, which is given as soon as the piece is loaded, or the firing about to commence, No. 1 breaks well off to the left with his left foot, bending the left knee and straightening the right leg, drops the end of the sponge staff into the left hand, back of the hand down, and fixes his eyes on the muzzle. The heels should be parallel with the wheel, the body erect on the haunches, and the sponge and rammer held in both hands in a horizontal position, the sponge head to the left.

The piece having been fired, No. 1 rises on his right knee, and returns to his position as in the third motion of *ram*.

At the command *load*, he steps in and performs his duties in the same manner as before.

When the loading is not by detail, No. 1 goes through all his duties at the command *load*, returns to his position outside the wheel, as given in the third motion of *ram*; breaks off at the command *ready*, and at the firing of the gun rises, steps in, and performs his duties as before. This he continues until the command *cease firing* is given, at which command he resumes the position he had before the first command *load*. If the sponging has been commenced when the command *cease firing* is given, it is completed before No. 1 resumes his post.

In sponging and ramming, if the length of the piece requires it, the sponge and rammer are to be pressed home in two motions, No. 1 extending his right hand to the end of the staff as soon as it reaches the muzzle.

In sponging *howitzers*, No. 1 presses the sponge to the bottom of the chamber, which should be well sponged out; he wipes the bore by rubbing its whole surface, without allowing the sponge to turn in his hands.

539. *Loading.*—The instructor places No. 2 on the left of the piece, where he remains faced to the front until the command *load*. At this command, he faces to his right, and by two oblique steps, corresponding to those of No. 1, the first with his left foot, the second with his right, at the command *two*, he places himself near the muzzle of the piece. At the command *three*, he brings up his left foot to the side of the right, and faces to the right, bringing his

hands together to receive the ammunition from No. 5; the cartridge in the right, the shot in the left hand. As soon as the sponge is withdrawn by No. 1, he faces to the left, and puts the ammunition into the muzzle, taking care that the seam of the cartridge does not come under the vent, and then steps back, commencing with his left foot, to his position outside the wheel, in the same manner that No. 1 does.

At the command *ready*, he breaks off well to the right with his right foot, bending the right knee, and straightening the left knee; the body erect on the haunches, the eyes fixed on the muzzle.

The piece having been fired, No. 2 raises on his left leg, remains facing the piece until he hears the command *load*, or the firing of the gun; then steps in, and performs his duty as before. At the command *cease firing*, he resumes his position outside the wheel, and faces to the front.

With the *howitzer*, No. 2 puts in the charge so that the fuze may rest against the rammer head, and No. 1 rams it home very carefully.

640. *Serving the vent*.—The instructor places No. 3 on the right of the piece, on a line with the knob of the cascable, and covering No. 1; he holds the priming wire in his right hand, thumb through the ring, the thumbstall on the left thumb, and the tube pouch fastened to his waist.

At the command *load*, he steps to his left, wipes the vent field (or surface around the vent) with the thumbstall, which he then holds pressed upon the vent, keeping his elbows raised; his fingers on the left side of the piece, so as to allow the gunner to point over his thumb; the right hand on the tube pouch. When the piece is sponged, and the charge inserted by No. 2, he jumps to the end of the trail handspike, and, seizing it with both hands, prepares to move it to the right or left, on a signal from the gunner, who taps the right of the trail for a movement to the left, and the left of it for a movement to the right. As soon as the piece is pointed, the gunner raises both hands as a signal to No. 3, who then resumes his post.

At the command *ready*, he steps to the piece, pricks the cartridge, taking care not to move the charge, and covers the vent with his left hand as soon as the friction tube is inserted. At the command

fire, he steps to his right, clear of the right wheel, and at the firing of the gun, or at the command *load*, serves the vent as before.

No. 3 must keep the vent closed from the time the sponge enters the muzzle, until the charge is inserted by No. 2.

641. *Firing*.—The instructor places No. 4 on the left of the piece, opposite No. 3, and covering No. 2; he is equipped with a tube pouch and lanyard.

At the command *load*, No. 4 inserts the lanyard hook into the ring of a primer, and stands fast.

At the command *ready*, he steps in with the right foot, drops the tube in the vent, takes the lanyard in his right hand, moves to the rear so far as to keep the lanyard slack, but capable of being stretched, without altering his position, which should be outside the wheel, the left foot broken to the left and rear.

As soon as No. 3 is clear of the wheel after the command *fire* is given, No. 4 pulls the lanyard briskly and firmly, passing the hand, back up, in a downward direction to the rear, so as to keep the lanyard hook from flying back in the direction of the face. Should the tube fail to explode the charge, the gunner immediately commands, *don't advance, the primer has failed*. Upon which No. 2 steps inside the wheel, close to the axletree, receives a priming wire over the wheel from No. 3, and a prepared primer from No. 4, pricks, inserts the primer, and resumes his post. At the command *cease firing*, No. 4 secures his lanyard.

In the absence of No. 4, No. 3 discharges his duties; after pricking the cartridge, he prepares and inserts a friction tube, steps to his post, faces the vent, breaks to his rear with his left foot, and at the command *fire*, discharges the piece. He then resumes his post, and tends the vent as before.

642. *Serving Ammunition*.—The instructor stations No. 5 five yards in the rear of the left wheel, and covering it, No. 7 in the rear and near the left limber wheel, and No. 6 in rear of the limber chest to issue ammunition. He is provided with a fuze-gauge, and prepares the shells or spherical case shot, according to the distance or time ordered, before delivering them to No. 5.

To cut the Fuze.—Place the projectile between the knees, fuze uppermost, and support it with the left hand. Holding the fuze-gauge in the right hand, place the left corner of its edge close to,

and on the right of the graduated mark indicating the time desired; then cut away gradually until the composition is exposed for a length about equal to the width of the gouge. Care must be taken not to cut the fuzes more rapidly than the demand for shells or case shot requires.

At the command *load*, No. 5 runs to the ammunition chest, receives from No. 7 or No. 6 a single round, the shot in the right hand, the cartridge in his left; takes it to the piece and delivers it to No. 2; returns immediately for another round, and then halts at his post until the piece is fired. In firing shell or spherical case, he exhibits the fuze to the gunner before delivering it to No. 2.

Ammunition pouches are worn by Nos. 5 and 7, hung from the left shoulder to the right side; the round is so placed in the pouch that the cartridge will be to the front. When it is brought up, No. 5 holds open the pouch, and No. 2 takes out the round with both hands. In rapid firing with round shot and canister, Nos. 5 and 7 may alternate in delivering the charges. At the command *cease firing*, No. 5 carries the round back to No. 6. No. 6 should keep the lid of the ammunition chest closed as much as possible. At the command *cease firing*, he carefully replaces the ammunition in the chest, and secures the lid.

643. *Loading by detail.*—For the instruction of the cannoneers united for the service of the gun, the exercise is first conducted by detail, the instructor giving all the commands. His commands are: *Load by detail*—LOAD; TWO, THREE, FOUR: SPONGE; TWO, THREE, FOUR; RAM; TWO, THREE: READY; FIRE; CEASE FIRING.

When the men are sufficiently instructed to go through the manual without detail, the commands of the instructor for that purpose are: *load; commence firing; cease firing; or simply, commence firing, and cease firing.* After the command *commence firing*, the action is continued as laid down for loading without detail, until the command *cease firing* is given, which is repeated by the chief of the piece and the gunner.

Moving the piece by hand. Piece unlimbered.

644. *To the front.*—The cannoncers being at their posts, the instructor commands:

1. *By hand to the front.* 2. MARCH. 3. HALT.

At the first command, the gunner seizes the end of the handspike, and Nos. 1, 2, 3 and 4, the spokes of the wheels. No. 1 with his left hand; Nos. 2, 3 and 4, with both hands; No. 1 holds the sponge with his right hand, the staff resting upon his right shoulder, sponge head down. At the second command they move the piece forward, the gunner raising the trail until the command *halt* is given, when all resume their posts.

645. *To the rear.*—The instructor commands:

1. *By hand to the rear.* 2. MARCH. 3. HALT.

At the first command, the gunner, facing to the rear, seizes the handspike with his right hand; Nos. 1, 2, 3 and 4, seize the wheels as before, except that No. 1, holding the sponge in his left hand, uses his right hand at the wheel. At the command *march*, they move the piece to the rear, the gunner raising the trail, until the command *halt* is given, when all resume their posts.

Changing posts.

646. In order to instruct the men in all the duties at the piece, the instructor causes them to change posts.

For this purpose he commands:

1. *Change posts.* 2. MARCH.

At the command *change posts*, the men on the right of the piece face to the rear; those who have equipments lay them down; No. 1 resting the sponge head on the nave of the wheel. At the command *march*, each man takes the place and equipments of the man in his front.

No. 1	takes the place of	No. 3.
No. 3	"	No. 8.
No. 8	"	No. 6.
No. 6	"	No. 7.
No. 7	"	No. 5.
No. 5	"	No. 4.
No. 4	"	No. 2.
No. 2	"	No. 1.

The gunner changes with one of the numbers, by special direction of the instructor.

647. *Equipments.*—The gunner, who is responsible for the equipments, either distributes them from the limber chest, or they may be hung on the neck of the cascable, and distributed by him to the proper numbers, at the command, *take equipments*, from the instructor. He receives them again at the command, *replace equipments*, making such disposition of them as may be directed.

Limbering.

648. *To the front.*—The instructor commands:

Limber to the front.

At this command, No. 1 steps up between the muzzle and the wheel, by the oblique steps indicated for loading; turns the staff, seizing it with the left hand, at the same time shifting his right, the back of the right up, that of the left down, and passes the sponge on its hook; rammer head to the rear, to No. 3, who receives the head, secures it against the stop, and keys it up. The piece is then brought about by the cannoneers, and the limber, inclining to the right, passes to its place in front of it, being drawn, when the horses are not attached, by Nos. 6 and 7, who take hold of the end of the pole for the purpose.

To bring the piece about, the gunner and No. 5 pass to the right of the handspike, and, facing toward the left, seize it, the gunner near the end, and No. 5 at the middle, and on his right, raise the trail and carry it round to the left; Nos. 1 and 2 bear down upon the muzzle, and Nos. 3 and 4, each using both hands, bring the wheels around; No. 3 turning the right wheel to the rear, and No. 4 the left wheel to the front. When the piece is brought about, the trail is lowered; Nos. 3 and 4 step within the wheels to avoid the limber; Nos. 1 and 2 remain at the muzzle, and the gunner and No. 5 step up between Nos. 3 and 4 and the trail, the gunner first taking out the handspike, and passing it to No. 4, by whom it is put up.

As soon as the limber is in front of the piece, the gunner commands, *halt, limber up*; upon which the limber halts, the gunner and No. 5 raise the trail by means of the handles, and, assisted by

Nos. 3 and 4 at the wheels, and Nos. 1 and 2 at the muzzle, run the piece forward, and place the lunette upon the pintle; the gunner then puts in the key, and all take their posts; when necessary, Nos. 6 and 7 assist at the trail in bringing the piece about, and in limbering up.

649. *To the right (or left).*—The instructor commands:

Limber to the right (or left).

The trail is turned to the right (or left), and the piece limbered up as before; the limber inclining to the right (or left), and taking its place by a right (or left) wheel.

650. *To the rear.*—The instructor commands:

Limber to the rear.

The limber inclines to the right, and takes its place by wheeling about to the left; the piece is then limbered up as before.

Posts of the cannoneers. Piece limbered.

651. Nos. 1 and 2 opposite the muzzle; Nos. 3 and 4 opposite the knob of the caseable; the gunner and No. 5 opposite the rear, and Nos. 6 and 7 opposite the front parts of the limber wheels; No. 8 is on the left, and opposite the limber chest of the caisson. All face to the front, which is now in the direction of the pole instead of the muzzle, and cover each other in lines one yard from the wheels; the even numbers on the right, the odd on the left. The chief of the piece is on the left, and, if not mounted, opposite the end of the pole; if mounted, he is near the leading driver, and on his left.

To form the detachment.

652. *To the front.*—The instructor commands:

Detachment—FRONT.

The gunner commands, *cannoneers, forward, march*; the even numbers move directly to the front; the odd numbers closing to the right upon them when clear of the piece. The gunner files

them to the left, halts the detachment in front of the piece, and faces them to the front. No. 8 moves directly forward, and takes his place in the detachment.

653. *To the rear.*—The instructor commands:

Detachment—REAR.

The gunners command, *cannoneers, rear face, march.* At the command *march*, the odd numbers move directly to the rear, the even numbers closing to the right upon them after passing the piece, the detachment is filed to the left at the proper distance, halted by the gunner opposite the piece and faced to the front, No. 8 taking his proper place in the detachment.

In forming the detachments in line, they are always, after halting, dressed to the right by the gunner.

Posts of the detachments at their pieces.

654. *In front.*—The detachment is in line facing to the front, two yards from the end of the pole or the leading horses.

In rear.—The centre of the detachment in two yards, behind the muzzle, and facing it.

On the right or left.—The detachment is in line opposite the axle-tree of the limber, and three yards from it. In *horse artillery*, it is in line with, and three yards from the leading horses. In all cases it faces to the front.

Change of posts of detachments at their pieces.

655. *From front to rear.*—The detachments being in line, in front of their pieces, to post them in rear, the instructor commands:

Detachments—REAR.

The gunner commands, *cannoneers, rear face, march.* At the command *march*, Nos. 1, 2, 3 and 4 oblique sufficiently to the left, and Nos. 5, 6, 7 and 8 to the right, move along the sides of their piece; reunite as soon as they have passed it, and are halted at the proper distance faced to the front, and aligned to the right by the gunner.

From rear to front.—The instructor commands:

Detachments—FRONT.

The gunner repeats the command, and adds *march*. At this command, the cannoneers oblique; Nos. 1, 2, 3 and 4 to the right, Nos 5, 6, 7 and 8 to the left; pass their piece, unite in front, and are halted and aligned to the right by the gunner.

From rear to right (or left).—The instructor commands:

Detachments—right (or left.)

The gunner commands, *right (or left) oblique, march*, and afterward *forward*, and *halt*, in time to bring the detachment to its post on the right or left. He then aligns it to the right.

In *horse artillery*, to change from front to rear, the gunners command, *left reverse, MARCH; FORWARD; left reverse, MARCH; HALT*. The *left reverse* is executed on the same principle as the *left about wheel* in cavalry tactics.

From rear to front.—The gunners command, *right oblique, MARCH; FORWARD. Left oblique, march; FORWARD; HALT*.

From rear to right (or left).—The gunners command *right (or left) oblique; MARCH; FORWARD; HALT*.

From right (or left) to rear.—The gunners command, *right (or left) reverse; MARCH; FORWARD; right (or left) reverse, MARCH; HALT*.

If the piece is moving when the last change of post is ordered, the gunner halts, or slackens the pace until it passes, and then commands, *left (or right) oblique. MARCH; FORWARD*.

The commands of the instructor in all these cases are the same as in mounted artillery. The movements are executed in the same manner when the detachments are dismounted.

To post the cannoneers at the piece limbered.

656. The detachment being formed in line in front or rear, on the right or left the instructor commands:

CANNONEERS, TO YOUR POSTS.

From the Front.—The gunner passes the detachment to the right and commands, *to your posts, march*. At this command, the cannoneers, Nos. 1 and 2, turning to the right, and opening out, file to their posts; halt at their proper places, and face to the front.

From the rear, right or left.—At the command *cannoneers, to your posts*, the gunner, in each case, faces the detachment to the left, and marches the cannoneers by that flank to their posts.

Moving the piece by hand. Piece limbered.

657. *To the front.*—The instructor commands:

1. *Forward.* 2. MARCH. 3. HALT.

At the first command, Nos. 6 and 7 seize the end of the pole with both hands, the gunner and No. 5, facing toward the pole, seize the splinter-bar with one hand, and the pole with the other. Nos. 3 and 4 seize the spokes of the hind wheels with both hands, and Nos. 1 and 2 apply both hands at the head of the carriage. At the second command, all acting together, urge the piece forward until the command *halt* is given, when all resume their posts.

To the rear.—The instructor commands:

1. *Backward.* 2. MARCH. 3. HALT.

At the first command, all face to the rear; Nos. 6 and 7 seize the end of the pole with both hands; No. 5 and the gunner seize the spokes of the limber, and Nos. 1, 2, 3 and 4, those of the hind wheels. At the command *march*, all moving together, move the piece to the rear, Nos. 6 and 7 keeping it straight by the use of the pole. At the command *halt*, all resume their posts.

Unlimbering and coming into action.

To the front.—The instructor commands:

Action—FRONT.

658. At this command, the gunner takes out the key, and assisted by No. 5, raises the trail from the pintle, and then commands *drive on*, upon which Nos. 6 and 7 reverse the limber, and proceed with it to the rear. Again reverse to the left, and halt so that the limber shall cover the piece, with the end of the pole six yards from the end of the trail handspike. At the same time that the limber moves off, the piece is brought about in all respects as in limbering to the front, except that the gunner and No. 5, without lowering the

trail, carry it about, each by means of the handle on his own side Nos. 6 and 7, when necessary, assist at the trail, after placing the limber in position.

As soon as the piece is brought about, and the trail lowered, No. 4 takes out the handspike and passes it to the gunner, who fixes it in the trail. No. 1 takes out the sponge, No. 3 unkeying it, and No. 4 prepares his lanyard. All then take their posts as required when the piece is *unlimbered*.

To the right (or left).—The instructor commands :

ACTION, *right (or left)*.

659. The piece is *unlimbered* in the same manner as for *action*, *front*, and placed in the required direction; the limber wheels to the left (or right), and takes its place in rear, by reversing to the left (or right).

To the rear.—The instructor commands :

1. *Fire to the rear.* 2. **IN BATTERY.**

660. At the command *in battery*, the piece is *unlimbered* as before; the trail immediately lowered, and the gun prepared for action; the limber moves directly forward at the command *drive on*, from the gunner, and takes its place by coming to the left about.

Movements with the prolonge.

661. The piece being in battery, to fix the prolonge to fire retiring, the instructor commands :

FIX PROLONGE TO FIRE RETIRING.

At this command, the limber inclines to the right, wheels to the left about, and halts four yards from the trail. No. 5 uncoils the prolonge and passes the toggle to the gunner, who fixes it in the trail by passing it upward through the lunette, whilst he attaches the other end to the limber by passing the ring over the pintle and keying it.

At the command *retire*, the cannoneers face about and all march on the left of the piece, except Nos. 1 and 3. They keep the implements in their hands, and, at the command *halt*, face about, resume their posts, and go on with the firing.

Should the piece be loaded at the command *retire*, No. 3 puts in the priming wire. At the command *halt*, he takes it out again, and No. 1 rams home. If the command *load* be given when the piece is in motion, No. 5 puts in the charge, and No. 2 serves vent, receiving from No. 3 the necessary implements for that purpose.

The piece being in action, to fix the prolonge to fire advancing, the instructor commands :

FIX PROLONGE TO FIRE ADVANCING.

At this command, the limber passes its piece on the right and halts when in front of it, Nos. 1 and 3 stepping within the wheels to avoid the limber. No. 5 uncoils the prolonge, carries it to the front, gives the toggle to No. 2, who puts it in the lunette of the axle-strap, whilst he places the ring over the pintle and keys it.

In advancing, the men retain their implements and march at their posts. At the command *halt*, No. 2 takes out the toggle and commands *drive on*, upon which the limber takes its place in rear, and the firing is renewed.

When the piece is limbered, to fix the prolonge to fire retiring or advancing, the same commands are given. The piece is unlimbered, and the prolonge attached as before.

To fix the prolonge passing a ditch, or for any other purpose, the command is, *fix prolonge*. The prolonge is then fixed to the trail as before.

In moving with the prolonge, the gunner attends the handspike, and in changes of direction, is careful to circulate the trail round in proper time to prevent the prolonge being cut by the wheels. No. 7 clears the prolonge from the limber wheels, and Nos. 1 and 2 from the gun wheels. In wheeling about the limber first backs a little and then describes a small circle. In passing a ditch the gunner takes out the handspike.

In fixing the prolonge for any purpose, the caisson wheels or reverses, if necessary, so that the horses of the limber and caisson may face in the same direction.

To detach the prolonge from the limber and coil it up, the instructor commands :

COIL PROLONGE.

At this command, the gunner takes out the toggle, and No. 5 takes off the ring and coils the prolonge, first passing the ring over the upper prolonge hook.

To coil the prolonge and limber the piece, the instructor commands, *coil prolonge—limber to the rear*. The prolonge is detached and coiled as before; the piece is run toward the limber, which reins back on receiving the command *rein back* from the gunner, and is limbered up. To limber to the front, right or left, the instructor commands, *coil prolonge—limber to the front, right or left*; which is executed as already described, the gunner commanding *drive on*, as soon as the prolonge is detached.

Service of the gun with diminished numbers.

662. Disabled men are replaced as soon as possible by the highest numbers, or, if men are selected to replace them, the highest numbers will be reduced to fill the vacancies thus created. During action, Nos. 1 and 2 may occasionally change places and numbers; the duties of No. 1 are very fatiguing.

Service of the piece by two men.—The gunner commands, points, serves the vent, and fires; No. 1 sponges, loads, and serves ammunition.

Three men.—The gunner commands, points, serves the vent, and fires; No. 1 sponges; No. 2 loads and serves ammunition.

Four men.—The gunner commands and points; No. 1 sponges; No. 2 loads and serves ammunition; No. 3 serves the vent and fires.

Five men.—The gunner commands and points; No. 1 sponges; No. 2 loads; No. 3 serves the vent and fires; No. 4 serves ammunition.

Six men.—The gunner commands and points; No. 1 sponges; No. 2 loads; No. 3 serves the vent and fires; No. 4 and 5 serve ammunition.

Seven men.—The gunner commands and points; No. 1 sponges; No. 2 loads; No. 3 serves the vent, and attends to the trail; No. 4 fires; No. 6 is at the limber, and serves ammunition to No. 5, and occasionally changes with him.

Eight men.—No. 7 assists No. 6; the other numbers as before.

Supply of ammunition when in action.

663. When it can be done without inconvenience, ammunition will be served direct from the rear chest of the caisson, No. 8 performing the duties prescribed for No. 6 at the limber chest. At convenient moments, the ammunition served out by No. 6 will be replaced from the rear caisson chest. If the ammunition chest on the limber of the piece is exhausted, the limber is replaced by that of the caisson, and the empty chest exchanged for the centre one of the caisson.

As a rule, the limber chests, and especially that of the piece, will be kept full at the expense of the others, so that in case of a sudden movement on the field, there shall always be a sufficient supply of ammunition at hand.

Pointing and ranges.

664. *To point a piece*, is to place it in such a position that the shot may reach the object it is intended to strike. To do this, the axis of the trunnions, being horizontal, the line of metal, called also the natural line of sight, must be so directed as to pass through the object, and then the elevation given to the piece to throw the shot the required distance. The *direction* is given from the trail, and the elevation from the breech; the trail being moved to the right and left by a handspike, and the breech raised or depressed by an elevating screw.

The *axis of the piece* coincides with that of the cylinder of the bore.

The *line of sight* in pointing is the line of direction from the eye to the object. It lies in a vertical plane, passing through, or parallel to the axis of the piece.

The *angle of sight* is the angle which the line of sight makes with the axis of the piece.

The *natural line of sight* is the straight line passing through the highest points of the base ring, the swell of the muzzle, muzzle sight, or muzzle band.

The *natural angle of sight* is the angle which the *natural* line of sight makes with the axis of the piece.

By *range* is commonly meant the distance between the piece and the object which the ball is intended to strike; or, the first graze of the ball upon the horizontal plane on which the carriage stands. *Point-blank* range is the distance between the piece and the point blank. *Extreme range* is the distance between the piece and the point where the ball finally rests.

665. *Theory of pointing*.—The *point-blank* is the second point of intersection of the trajectory or curve described by the projectile in its flight with the line of sight. As the angle of sight is increased, the projectile is thrown farther above the line of sight, and the trajectory and point-blank distance becomes more extended.

The point-blank range increases with the *velocity*, the *diameter*, and the *density* of the ball.

A piece is said to be aimed *point-blank* when the line of metal, which is the natural line of sight, is directed upon the object. This must be the case when the object is at point-blank distance. When at a greater distance, the pendulum hausse, or the tangent scale, is raised upon the breech until the sight is at the height which the degree of elevation for the distance may require. An *artificial* line of sight, and an *artificial* point-blank are thus obtained, and the piece is aimed as before.

Pendulum hausse.—The instrument at present in most general use in pointing field guns at objects beyond the natural point-blank, is called a *pendulum hausse*, of which the component parts are denominated the *scale*, the *slider*, and the *seat*. The *scale* is made of sheet brass; at the lower end is a brass bulb filled with lead. The *slider* is of thin brass, and is retained in any desirable position on the scale by means of a brass set screw with a milled head. The scale is passed through a slit in a piece of steel, with which it is connected by a brass screw, forming a pivot on which the scale can vibrate laterally; this slit is made long enough to allow the scale to take a vertical position in any ordinary cases of inequality of the ground on which the wheels of the carriage may rest. The ends of this piece of steel form two journals, by means of which the scale is supported on the *seat* attached to the piece. The seat is of iron and is fastened to the base of the breech by three screws, in such manner that the centres of the two journal notches shall be at a distance from the axis equal to the radius of the base ring.

A *muzzle-sight* of iron is screwed into the swell of the muzzle of *guns*, or into the middle of the muzzle ring of *howitzers*. The height of the sight is equal to the *dispart* of the piece, so that a line from the *top* of the muzzle sight to the *pivot* of the scale is parallel to the axis of the piece. Consequently, the vertical plane of sight passing through the centre line of the scale and the top of the muzzle sight will be also parallel to the axis in any position of the piece; the scale will therefore always indicate the angle which the line of sight makes with the axis.

The *hausse*, when not in use, is carried by the gunner in a leather pouch, suspended by a shoulder strap.

On pointing.

666. As it is impossible to point a piece correctly without knowing the *distance* of the object, artillery men should be frequently practised in estimating distances by the eye alone, and rectifying the estimate afterward, either by pacing the distance, or by actual measurement with a tape-line or chain, until they acquire the habit of estimating them correctly.

Shells are intended to burst *in* the object aimed at; *spherical case shots* are intended to burst from fifty to seventy-five yards short of it.

Shell or spherical case firing, for long ranges, is less accurate than that of solid shot.

At high elevations, a solid shot will range farther than a shell or spherical case shot, of the same diameter, fired with an equal charge. But at low elevations, the shell or spherical case will have a greater initial velocity, and a longer range. If, however, the charges are proportioned to the weights of the projectiles, the solid shot will, in all cases, have the longest range.

The velocity or range of a shot is not affected in any appreciable degree by checking the recoil of the carriage, by using a tight wad, or by different degrees of ramming.

The principal causes which disturb the true flight of the projectile are as follows :

1st, If the wheels of the carriage are not upon the same horizontal plane, the projectile will deviate toward the *lowest* side of the carriage.

2d. If the direction of the wind is across the line of fire, deviations in the flight of the projectile will be occasioned, and in proportion to the strength of the wind the angle its direction makes with the line of fire and the velocity of the projectile.

3d. If the centre of gravity of the projectile be not coincident with the centre of figure, the projectile will deviate towards the *heaviest side*, that is, in the same direction that the centre of gravity of the projectile, while resting in the piece, lies with regard to the centre of figure. Therefore, if a shot be placed in the piece so that its centre of gravity is to the *right* of the centre of the ball, the shot will deviate to the *right*; and *vice versa*. If the centre of gravity be above the centre of figure, range will be *increased*; if below, it will be diminished.

Solid shot should be used from 350 yards upwards; the use of canister should begin at 350 yards, and the rapidity of the fire increases as the range diminishes. In emergencies, double charges of canister may be used at 150 or 160 yards, with a single cartridge.

Spherical case should not, as a general rule, be used for a less range than 500 yards; and neither spherical case nor shells should be fired at rapidly advancing bodies, as, for instance, cavalry charging.

The fire of spherical case and of shells on bodies of cavalry in line or column, and in position, is often very effective. To the destructive effects of the projectile are added the confusion and disorder occasioned amongst the horses by the noise of their explosion; but neither shells nor spherical case should be fired so rapidly as solid shot.

In case of necessity, solid shot may be fired from howitzers.

SCHOOL OF THE BATTERY.

Composition of the battery, and the officers and men necessary to man it.

667. The battery is composed of four, six or eight pieces; six pieces will be supposed. It is divided into three sections of two pieces each, denominated the *right, centre and left* sections, according to their position in line. The battery is commanded by a captain; each section is commanded by a lieutenant, called the *chief of section*, and an additional lieutenant is necessary to command the line of caissons. Each piece is commanded by a sergeant, as *chief of the piece*, while the gunner and chief of caisson are corporals. The officers and men necessary to man the battery constitute a *company*, which is divided into as many *platoons* as there are pieces. Each platoon is composed of the drivers and cannoneers of a single piece, and is commanded by the chief of the piece; the cannoneers of a piece, as already stated in the school of the piece, constitute the *gun detachment*. When the drivers and cannoneers form together, the drivers form on the left.

Two platoons constitute a *section*.

In addition to the platoons, there should be a *first* (or *orderly*) *sergeant* attached to the company; a *quartermaster-sergeant*; two *buglers* or *trumpeters*; one *guidon*; and as many artificers as may be necessary to keep the guns, carriages, harness, etc., in order.

When the company is formed, the platoons form in line in the order of their pieces.

Posts of the officers, non-commissioned officers, etc.

668. The captain commanding goes where his presence may be necessary, or his commands best heard. His position, in the *order in line*, is four yards in front of the centre of the company; in the *order in column*, or when the company is *faced by a flank*, four yards outside the flank in the first case, and from the company in the second, and opposite the centre.

The lieutenants commanding sections *in line*, or *in column of sections*, are two yards in front of the centres of their respective sections; in *columns of platoons* or *of detachments*, or when faced by *a flank*, they are two yards outside the marching flank, and opposite the centres of their respective sections; except that when faced by *a flank*, the chief of the leading section takes his place at the side the leading file.

The chief of the line of caissons, is four yards in rear of the centre of the company when it is *in line*; when it is *in column*, or faced by *a flank*, he is four yards outside the pivot flank, and opposite the centre of the company.

The chiefs of pieces, when the company is *in line*, *in column of sections*, or faced by *a flank*, are on the right of the gun detachments of their respective platoons, in the front rank. In *column of platoons*, or *of detachments*, they are one yard in front of the centre of their platoons or of their gun detachments.

The gunners, when the company is *in line*, or in *column of sections*, are one yard behind the right files of their respective gun detachments. In *column of platoons*, or *detachments*, they are on the right of the gun detachment. When faced by *a flank*, they face with the company, and retain their relative positions.

The chiefs of cannons are in their places in the ranks as No. 8 of the gun detachments, or as the front rank men on the left of their platoons.

The first sergeant, when the company is *in line*, is on the right of the front rank, and one yard from it; when it is *in column*, he is on the marching flank, one yard outside the section, platoon, or detachment nearest him when in line. When the company faces by *a flank*, he faces with it.

The quartermaster-sergeant is on the left of the company, and occupies positions corresponding to those of the first sergeant on the right.

When the company is *in line*, the buglers are on the right of the first sergeants, in one rank, and two yards from line; *in column*, they are six yards in front or rear of the subdivision next them in line, according as that subdivision forms the head or rear of the column. When the company is faced by *a flank*, they face also.

The artificers occupy positions on the left of the company, corresponding to those of the musicians on the right.

The guidon forms with the musicians, or takes such position as the captain prescribes.

Manning the Battery.

699. The gun detachments and teams, having been properly tolled off, are marched to the battery or park, with the teams in front.

The chiefs of pieces and caissons, when mounted, march with the teams; when the teams reach the battery, they are hitched by the drivers.

In forming the detachments they are formed in line, touching each other, and in positions corresponding to the positions of their pieces in the battery. The chiefs of section, etc., are at their posts as directed for the company in line.

The detachments are marched to the battery, either in column or in line, as circumstances may require.

Each detachment is halted by its gunner when opposite its piece, and wheeled into line.

If approaching from the front or rear, the detachments are formed in line facing the battery, in the same order as their pieces, and the captain commands:

DETACHMENTS, OPPOSITE YOUR PIECES.

At this command, each detachment is wheeled or faced in the proper direction by its gunner, marched opposite its piece, and formed in line.

The captain, after all the detachments have been halted in front or rear of their pieces, commands:

CANNONEERS, TO YOUR POSTS.

At this command the gunners face their detachments, and all take their posts, as directed in No. 656.

The position of the detachment in *horse artillery*, is habitually two paces in rear of the muzzle of the piece, but its position may be changed by the means laid down in No. 655.

During the manœuvres of mounted artillery, the cannoneers are seated on the ammunition chests as follows: The gunner and Nos. 5 and 6, on the limber chest of the piece, the gunner on the right, and No. 5 on the left; Nos. 1, 2 and 7, on the limber chest of the caisson, No. 2 on the right, and No. 1 on the left; Nos. 3, 4 and 8 on the middle chest of the caisson, No. 4 on the right, and No. 3 on the left.

When circumstances require it, Nos. 6 and 7 may be directed to mount the rear chest of the caisson. They sit with their backs to the front, No. 6 on the right.

To mount and dismount the Cannoneers.

670. *To mount.*—The captain halts the battery, if not already at a halt, and commands:

1. *Cannoneers, prepare to mount.* 2. MOUNT.

At the first command, the cannoneers run to their respective places, and stand facing the chests which they are to mount. The gunner and No. 5 in rear of the gun limber; No. 6 on the right of the gunner; Nos. 1 and 2 in rear of the caisson limber; No. 7 on the left of No. 1; Nos. 3 and 4 in front of the middle chest of the caisson; No. 8 on the right of No. 3. The gunner and Nos. 2 and 3 seize the handles with the right hand, and step upon the stocks with the left foot; and Nos. 5, 1 and 4, seize the handles with the left hand, and step upon the stocks with the right foot.

At the command *mount*, the gunner and Nos. 1, 2, 3, 4 and 5, spring into their seats. The gunner and Nos. 5, 1 and 2, seat themselves in their places with their backs to the front, and immediately face about, by throwing their legs outward over the handles.

No. 8 then springs into his seat in the same manner as No. 3; Nos. 6 and 7 step in rear of their chests, place their hands upon them, step upon the stocks with their nearest feet, spring up, step over the boxes and take their seats, placing their hands on the shoulders of the men already seated in order to steady themselves.

When the command *cannoneers, mount*, is given by itself, the men run to their places and spring into their seats at once, No. 8 taking his seat before No. 3.

671. *To dismount.*—The captain halts the carriages as before, and commands:

1. *Cannoneers, prepare to dismount.* 2. DISMOUNT.

At the first command, the cannoneers stand up in their places, except the gunner and No. 5, who face about. At the second command, the whole jump off and run to their posts.

When the command *cannoneers, dismount*, is given by itself, the men jump from their chests in the same manner.

The cannoneers always dismount at the command, *action front, right* (or *left*). They also dismount at the command *in battery*, as soon as the carriage on which they are mounted halts.

In *horse artillery*, the gunner dismounts the cannoneers when the command *action front, right* or *left*, or *in battery*, is given, and all move to their posts in double quick time, and unlimber as rapidly as possible.

The object of mounting the cannoneers on the ammunition chests, is generally to enable the battery to make quick movements.

To unpark.

672. Everything being prepared for manœuvring, if the captain wishes to unpark by the right, he commands:

1. *By piece—from the right—front into column.* 2. MARCH.

At the command *march*, the right piece, followed by its caisson, marches direct to the front, and the captain indicates the direction it should take. The other pieces and caissons follow the movement of the right piece, each so regulating its march by that which precedes it, as to march in the same direction, and two yards behind. Each chief of section directs the march of his carriages, which are so conducted by their chiefs as to enter the column by the most simple movement. The column of pieces is thus formed with a distance of two yards between the carriages; and in *horse artillery* with the same distance between the carriages and detachments.

The captain goes wherever his duty may require, but generally remains on the left flank, opposite the centre of the column.

The chief of the leading section places himself near the chief of the leading piece, and on his left; the other chiefs of sections four yards from the left flank, abreast the centres of their respective sections.

The chief of the line of caissons is in rear of the chief of the centre section.

Each chief of piece and caisson, when mounted, is near his leading driver, on the left.

The trumpeter is near the captain.

When the battery is parked with the caissons in front, the captain causes it to unpark by the right by the same commands; the movements being executed in the same manner.

The battery may be unparked by the left according to the same principles and by inverse means.

The column of pieces is not to be considered a column of manoeuvre. It will be changed into a column of sections as soon as the nature of the ground will permit. But the exigencies of service sometimes require that formations into line and battery should be made directly from the column of pieces. In such cases, the principles and commands laid down for similar formations from the column of sections, will govern. In the formations to the right or left, the pieces must close up, and wheel successively when opposite their proper places.

To halt.

To halt the battery, when marching in column of pieces, the captain commands:

1. *Column.* 2. **HALT.**

At the second command, repeated by the chiefs of sections, all the carriages are immediately halted.

Change of gait.

673. The changes of gait, in column of pieces, are executed by the following commands from the captain:

To pass from the walk to a trot.

1. *Trot.* 2. MARCH.

To pass from a trot to a walk.

1. *Walk.* 2. MARCH.

At the first command, repeated by the chiefs of sections, all the drivers and others on horseback prepare to change the gait; and at the second, repeated in like manner, they pass at once to the gait indicated by the first command.

To form sections.

674. When the battery is marching at a walk in column of pieces, to form sections at the same gait by gaining ground to the left, the captain commands:

1. *Form sections, left oblique.* 2. MARCH. 3. *Guide right.*

The chief of the leading section repeats the commands, *Form section, left oblique, march; guide right*, in succession after the captain. At the command *march*, the two first carriages, piece and caisson, continue to march, and halt when they have advanced five yards. The two following gain their interval of fourteen yards by obliquing to the left, and place themselves abreast and parallel with the other two.

The other sections continue to march in column of pieces, and are formed successively by their chiefs; each commanding, *form section, left oblique*, in time to command *march*, when the leading carriage of his section has arrived within five yards of its distance. The chief of section then commands, *guide right*.

When the column of pieces is marching at a trot, the formation is executed according to the same principles and by the same commands. But the leading carriages, instead of advancing five yards and halting as before, pass to a walk as soon as the command *march* is repeated by the chief of section. The other sections continue to march at a trot, and execute the movement at that gait; the two leading carriages of each section passing to a walk at the

command *march*, which must be given when they have closed to their proper distance.

When the column of pieces is at a halt, the formation is executed as prescribed for the column at a walk. In this case the carriages all move at the command *march*, and the leading ones halt after advancing five yards.

When the column of pieces is marching at a walk, to form sections at a trot gaining ground to the left, the captain commands :

1. *Form sections, left oblique, trot.*
2. MARCH.
3. *Guide right.*

The chief of the leading section repeats the commands, *form section, left oblique, trot ; march ; guide right*, in succession, after the captain. At the command *march*, the two leading carriages continue to march in the original direction at a walk. The two following oblique to the left, gain their interval at a trot, and resume the walk when opposite the leading carriages.

At the first command, the chiefs of the other sections command *trot* ; and at the second, which they repeat, their sections commence the trot.

The chiefs of the second and third sections command, *form section, left oblique*, in time to command *march*, when the leading carriage of each section has nearly gained its distance. The leading carriage then resumes the walk, and the chief of section commands, *guide right*.

The chiefs of sections superintend their carriages, and take the posts assigned them in the order in column as soon as their sections are formed.

Sections are formed by gaining ground to the right according to the same principles and by inverse means.

The battery being in column of pieces, to form the caissons on the flank.

675. When the battery is in column of pieces with the caissons in rear, to form the pieces and caissons into separate columns, as in the flank march of a battery in line, the captain commands :

1. *Caissons left* (or *caissons left, trot.*) 2. MARCH. 3. *Guide right.*

These commands are repeated by the chiefs of sections, the caissons oblique at once to the left, gain the interval of fourteen yards, and place themselves opposite their pieces; the pieces closing upon each other at the same time to the usual distance. The gait is regulated as in the formation of sections; and when the movement is performed at a walk, the leading carriage halts after advancing its own length.

The chiefs of sections take their places as in column of sections.

The caissons are formed on the right according to the same principles and by inverse means.

When the pieces are in rear, they are formed on the right or left of their caissons in the same manner and by corresponding commands.

To march in column.

676. The battery being in column at a halt, to advance, the captain commands :

1. *Column, forward.* 2. MARCH. 3. *Guide left* (or *right.*)

The commands *forward march* ; *guide left* (or *right,*) are repeated by the chiefs of sections. At the command *march*, all the carriages advance, the guide maintains the direction, and the carriages, as well as the detachments of horse cannoneers, preserve their intervals and distances.

To march by a flank.

677. The battery being in column, in march or at a halt, to gain ground to the left, the captain commands :

1. *Column, by the left flank.* 2. MARCH.

The commands, *by the left flank, march*, are repeated by the chiefs of sections. At the command *march*, each carriage wheels at once to the left.

When the wheel is nearly completed, the captain commands :

1. FORWARD. 2. *Guide right.*

These commands are repeated by the chiefs of sections. At the command *forward*, all the carriages march direct to the front.

The line is regularly established, and the carriages aligned in each rank, with their distances of two, and intervals of fourteen yards. The chiefs of sections take their places between the leading carriages as in line.

To cause the battery to resume its original direction, the captain commands :

1. *Battery, by the right flank.* 2. MARCH. 3. FORWARD.
4. *Guide left.*

The commands, *by the right flank, march; forward; guide left*, are repeated and executed according to the principles before described.

After the flank march, to march the battery in a direction opposite to the original one, the captain commands :

1. *Battery, by the left flank.* 2. MARCH. 3. FORWARD.
4. *Guide right.*

In *horse artillery* the flank march is executed according to the same principles and by the same commands. The line formed by the flank movement is established, and the carriages aligned in each rank, with distances of five and intervals of fourteen or twenty-one yards, according to the relative position of the pieces and caissons. The detachments wheel in the same direction as their pieces; and, after following them during a part of the movement, place themselves by their sides, two yards from the wheels, with the heads of their leading horses on a line with the axle-trees of the limber. In marching by the left flank they are on the left of their pieces, and the reverse when marching by the right. When sufficient ground has been gained to the flank, and the battery resumes its formation in column by marching in the original direction, the detachments wheel in the same direction as their pieces and place themselves in their rear. But when the march in col-

umn is in the opposite direction, they resume their places by allowing their pieces to pass them and then falling in their rear.

The flank march, to gain ground to the right, is executed according to the same principles and by inverse means.

In each case the captain and the chief of the line of caissons change their direction to the left or right, and conform to the movements of the battery.

Oblique march.

678. The battery being in column, in march or at a halt, to cause it to march obliquely to gain ground to the front and left, the captain commands :

1. *Column, left oblique.* 2. MARCH. 3. *Guide right.*

The chiefs of sections repeat the commands, *left oblique; march; guide right.* At the command *march*, all the carriages oblique at once to the left, and march direct to the front in the new direction; moving in parallel lines, dressing by the right, and preserving their intervals from that flank.

In obliquing, the heads of the horses in each rank are on a line parallel to the original front of the column. The interval between the carriages is fourteen yards, measured parallel to the front; and only ten if measured perpendicularly to the oblique direction. Each carriage of the right file marches in the prolongation of the left carriage of the rank which precedes its own, and at a distance of nine yards.

The officers conform to the movement and preserve their relative positions.

To resume the original direction the captain commands :

FORWARD.

This command is repeated by the chiefs of sections, and the carriages resume the original direction by obliquing to the right.

If the captain wishes to halt the column for the purpose of rectifying its alignments, intervals, or obliquity, he commands :

1. *Column.* 2. HALT.

And to resume the march in the oblique direction :

1. *Column.* 2. MARCH. 3. *Guide right.*

The commands *halt*; *march*; *guide right*, are repeated by the chiefs of sections.

The *right oblique* is executed according to the same principles and inverse means.

Passage of carriages in column.

679. When the battery is marching in column at a walk, to change the relative positions of the front and rear ranks, without altering the gait, the captain commands:

1. *Pieces pass your caissons (or caissons pass your pieces).*
2. MARCH.

These commands are repeated by the chiefs of sections; and at the command *march*, the leading carriages of each section halt. Those of the rear rank execute the passage without changing the gait, and halt as soon as they have reached their positions in front.

To continue the march without halting the carriages of the rear rank, the captain commands *forward*, when the passage is nearly completed and the command is repeated by the chiefs of sections.

When the column is marching at a trot, the passage is executed according to the same principles and by the same commands, except that the carriages of the front rank move at a walk instead of halting at the command *march*. The carriages of the rear rank execute the passage at a trot, and then change the gait to a walk.

When the column is at a halt, the passage is executed according to the same principles and by the same commands. If the captain wishes to put the column in march immediately after the movement, he commands *forward*, when the passage is about being completed, and then *guide left (or right)*. These commands are repeated by the chiefs of sections.

When the column is marching at a walk, to execute the passage at a trot, the captain commands:

1. *Pieces pass your caissons, trot (or caissons pass your pieces, trot).*
2. MARCH.

These commands are repeated by the chiefs of sections. At the

command *march*, the carriages of the front rank in each section continue to march at a walk. Those of the rear rank execute the passage at a trot, and resume the walk as soon as the passage is completed.

About in column.

680. The battery being in column, in march or at a halt, to face it to the rear, the captain commands :

1. *Pieces and caissons, left about.* 2. MARCH.

These commands are repeated by the chiefs of sections ; and at the second all the carriages execute the about. When the movement is about being completed the captain commands, *column, halt ; or forward, guide right (or left) ;* the commands, *halt, or forward, guide right (or left),* are repeated by the chiefs of sections.

Countermarch in column.

681. The battery being in column, in march or at halt, to execute the countermarch in each section, the captain commands :

1. *Countermarch.* 2. MARCH.

These commands are repeated by the chiefs of sections, and at the second, each piece and its caisson execute the countermarch. When the movement is about being completed, the captain commands, *column, halt ; or forward ; guide right (or left).*

These commands are repeated as in the preceding paragraph.

To change direction in column.

682. The battery being in column, in march or at a halt, to cause it to change direction to the left, the captain commands :

Head of column to the left.

The chief of the leading section commands, *left wheel—MARCH ;* and afterward, *forward.* At the command *march*, the pivot carriage executes the wheel without changing the gait. The carriage on the wheeling flank wheels in such a manner as to conform to its move-

ment; increasing the gait, and preserving the intervals. At the command *forward*, the pivot carriage moves direct to the front, and the other resumes its original gait after completing the wheel and arriving upon the same line. The carriages of the rear rank preserve their distance and follow those of the front rank.

Each of the other sections, on arriving at the point where the first wheeled, executes the same movement, and by the same commands from its chief.

Each chief of section must give the command *left wheel* in time to command *march*, when the heads of his leaders are three yards from the wheeling point. And the command *forward* must be given as soon as the leading pivot carriage has entered the new direction.

The change of direction to the right is executed according to the same principles and by inverse means.

To diminish the front of a column on the march.

683. The battery marching at a walk in column of sections, to form column of pieces from the right, at that gait, the captain commands:

1. *By the right, break sections.* 2. MARCH.

The chief of the leading section commands, successively, after the captain, *by the right, break section; march*. At the command *march*, the two right carriages of the leading section continue to march at a walk, and all the other carriages halt. The left carriages of the leading section remain halted, until the leaders of the leading carriage are passed by the wheel horses of the rear carriage on the right. They then oblique to the right, take their places in column, and follow the two leading carriages. The other sections are broken in succession by the same commands from their chiefs; the command *march* being given when the wheel horses of the left carriages of the next preceding section enter the right oblique.

When the column is marching at a trot, the column of pieces is formed according to the same principles and by the same commands. But in this case the carriages which halted before slacken the gait to a walk, and resume the trot to oblique, and enter the column.

When the column is at a halt, the movement is executed as pre-

scribed for a column marching at a walk ; the two right carriages of the leading section moving forward at a walk at the command *march*.

The battery marching at a walk in column of sections, to form column of pieces from the right at a trot, the captain commands :

1. *By the right, break sections, trot.* 2. MARCH.

The chief of the leading section commands successively, after the captain, *by the right, break section, trot ; march ;* and at the right carriages of the leading section move forward at a moderate trot. The left carriages of the same section commence the trot on obliquing to enter the column.

The other sections are broken successively by the same commands from their chiefs ; and the carriages are regulated by each other, as in breaking sections at a walk.

This formation is executed from the left, according to the same principles and by inverse means.

In column with the caissons on the flank, to replace them in front or rear.

684. The battery being in column with the caissons on the flank, to re-establish them in rear of their pieces, the captain commands :

1. *Caissons, rear (or caissons, rear, trot).* 2. MARCH.

Each chief of section repeats the commands in time to command *march*, when the leading piece of his section is to commence the movement. The piece at the head of the column moves forward with the required gait, and its caisson places itself in rear by an oblique. The other pieces move forward in succession, and are followed by their caissons in like manner.

All the carriages preserve the usual distance in column.

This movement is performed with the different gaits, and according to the principles prescribed for breaking sections.

The formation for placing the caissons in front is executed by the commands, *caissons, front (or caissons, front, trot) ; march*, the caissons obliquing successively in front of their pieces.

To pass from the order in column to the order in line, and the reverse.

In all formations in line or column, the movements are the same whether the pieces or caissons lead.

Forward into line.

685. The battery being in column at a halt, to form it into line on the head of the column, gaining ground to the left, the captain commands :

1. *Forward into line, left oblique.* 2. MARCH. 3. *Guide right.* 4. FRONT.

At the first command, the chief of the leading section commands, *section, forward*, and those of the other sections, *section, left oblique*. At the command *march*, repeated by the chiefs of sections, the leading section moves to the front, and its chief repeats the command for the guide. After advancing eighteen yards, or for horse artillery twenty-two, he commands, *section, halt ; right, dress*.

Each of the other chiefs of sections repeats the command for the guide, and conducts his section by a left oblique, until by the direct march it may gain its proper interval from the section immediately on its right. He then commands, *forward*, and when within four yards of the line, *section, halt ; right, dress*.

When the battery is aligned, the captain commands *front*.

The movement is executed on the opposite flank, according to the same principles, and by inverse means.

In this case the commands are, *forward into line, right oblique, march ; guide left, front*.

The formation forward into line by a right or left oblique, executed in a similar manner when the column is in march. In this case the chief of the leading section gives no command except for the guide, until he has advanced the distance before prescribed. He then halts his section as before.

To form line faced to the rear.

686. The battery being in column at a halt, to form it into line faced to the rear, on the head of the column gaining ground to the left, the captain commands :

1. *Into line, faced to the rear, left oblique.* 2. MARCH.
3. *Guide right.* 4. FRONT.

At the first command, the chief of the leading section commands, *section, forward* ; and those of the other sections, *section, left oblique*. At the command *march*, repeated by the chiefs of sections, the movement is executed as in No. 685, with the exception of the alignment. When the leading section has advanced eighteen yards, or for horse artillery twenty-two, it is halted by its chief until the centre section arrives upon the same line. He then commands, *countermarch—march* ; and when the countermarch is nearly completed, *section, halt ; left, dress*.

The centre section is halted upon the line, in like manner, until the left section comes up, and is then countermarched and aligned by the same commands.

When the left section arrives upon the line, it is countermarched before halting, and then aligned like the rest.

When the centre and left sections are countermarched, the commands, *halt ; left dress*, should be given, if possible, when they are four yards in rear of the line on which the leading section is established.

When the battery is aligned, the captain commands *front*.

The movement is executed on the opposite flank, according to the same principles and by inverse means.

The formation into line, faced to the rear, by a right or left oblique, is executed in a similar manner when the column is in march. In this case, as the leading section is already in motion, its chief only repeats the command for the guide as in No. 685.

To form line to the right or left.

687. The battery being in column, in march or at a halt, to form it into the line to the left, the captain commands :

1. *Left into line, wheel.* 2. MARCH. 3. *Battery—HALT.*
4. *Left—DRESS.* 5. FRONT.

At the first command the chiefs of sections command, *section, left wheel*; and at the second, which they repeat, all the sections wheel to the left. Each chief of section commands, *forward, guide left*, as soon as his leading pivot carriage has taken a new direction.

When the rear carriages have completed the wheel, and the sections are in line, the captain commands, *battery, halt; left dress.*

The commands, *halt, left dress*, are repeated by the chiefs of sections, and when the alignment is completed the captain commands *front*.

The battery is formed into line to the right according to the same principles and by inverse means.

To form line on the right or left.

688. The battery marching in column, to form it into line on the right, the captain commands:

1. *On the right into line.* 2. MARCH. 3. *Guide right.*
4. FRONT.

At the first command, the chief of the leading section commands, *section, right wheel*; and at the second, which he repeats, the section wheels to the right. As soon as the leading pivot carriage enters the new direction, he commands, *forward, guide right*; and as the section completes the wheel and unmask the column, he commands, *section, halt; right dress.*

The chiefs of the other sections repeat the command for the guide, and their section continues to move forward. As each section passes the one preceding it in the formation, its chief establishes it on the line, with the proper interval, by the same commands. The commands, *section, halt; right dress*, are given when the section is four yards in rear of the line.

When the battery is aligned, the captain commands *front*.

The line is formed on the left according to the same principles

and by inverse means. The commands are, *on the left into line, march ; guide left ; front.*

When the column is at a halt, the line is formed on the right or left in the same manner. In this case, the chiefs of the two rear sections command, *section, forward*, and afterward repeat the commands, *march ; guide right (or left.)*

To break into column to the front.

689. The battery being in line at a halt, to break into column to the front from the right, the captain commands :

1. *By section from the right, front into column.* 2. MARCH.
3. *Guide left.*

At the first command, the chief of the right section commands, *section, forward* ; and those of the other sections, *section, right oblique*. At the command *march*, repeated by the chief of the right section, that section moves forward, and its chief repeats the command for the guide.

Each of the other chiefs of sections repeats the commands, *march, guide left*, after the section on his right has commenced the movement, and when the leaders of its rear carriages are in line with him. After obliquing sufficiently to gain the rear of the preceding sections, he commands *forward*.

The movement is executed from the left according to the same principles and by inverse means.

To break into column to the rear.

The battery being in line, in march or at a halt, to break into column to the rear from one of the flanks, the captain executes an about or a countermarch, according to the kind of carriage he may wish in front, then halts the battery, and breaks it into column to the front by the preceding manœuvre.

To break into column to the right or left.

690. The battery being in line, in march or at a halt, to break it into columns to the left, the captain commands :

1. *By section, left wheel.* 2. MARCH. 3. FORWARD.
4. *Guide left.*

At the first command, the chiefs of sections command, *section, left wheel*; and at the second, repeated by those chiefs, all the sections wheel to the left. When the wheels are nearly completed the captain commands, *forward, guide left*, and the chiefs of sections repeat the commands.

When the column is not to advance, the command, *column, halt*, is substituted for *forward, guide left*.

The battery is broken into column to the right according to the same principles and by inverse means.

To break into columns to the front from one flank, to march toward the other.

691. The battery being in line at a halt, to break from the right to march to the left, the captain commands :

1. *By section, break from the right, to march to the left.*
2. MARCH. 3. *Guide left.*

At the first command, the chief of the right section commands, *section, forward*; and at the second, which he repeats, the section moves forward, and he commands, *guide left*. After advancing eleven yards he changes the direction to the left by the commands, *section, left wheel; march; forward*.

Each of the other chiefs of sections command, *section, forward*, in time to command *march*, when the limber wheels of the rear carriages in the section preceding his own arrive in front of him. He then conducts the section to the front, changes its direction to the left, and places it in rear of the preceding section by the commands already prescribed for the section on the right.

The battery is broken from the left to march to the right, according to the same principles and by inverse means.

To break into column to the rear from one flank, to march toward the other.

692. The battery being in line at a halt, to break to the rear from one flank to march toward the other, the captain first executes an about or countermarch, according to the kind of carriage he may wish in front. He then halts the battery and executes the preceding manœuvre.

To break into column to the front when the battery is marching in line.

693. The battery marching in line at a walk, to break into column to the front from the right, and at the same gait, the captain commands :

1. *By the right, break into sections.* 2. MARCH. 3. *Guide left.*

The chief of the right section repeats the command for the guide and his section continues to move at the same gait. At the command *march*, the other sections are halted by the command, *section, halt*, from their chiefs.

The halted sections are put in motion successively by their chiefs; each commanding, *section, right oblique*, in time to command *march*, when the leaders of the rear carriages in the section on his right arrive opposite to him. The sections oblique and enter the column as described in No. 689.

When the battery is marching at a trot, the movement is executed according to the same principles. But the sections which halted in the preceding case slacken the gait to a walk at the commands, *walk, march*, from their chiefs. They again trot and enter the column by the commands, *section, right oblique, trot ; march ; forward*.

When the battery is marching in line at a walk, to break into column from the right at a trot, the captain commands :

1. *By the right break into sections, trot.* 2. MARCH. 3. *Guide left.*

At the first command, the chief of the right section commands

trot; and at the second, which he repeats, the section changes its gait to a trot. He afterwards repeats the command *guide left*.

Each of the other sections continues to march at a walk until required to enter the column, when its chief conducts it, as already described, by the commands, *section, right oblique, trot; march; forward*.

The battery is broken into column from the left, according to the same principles and by inverse means.

To form line advancing.

694. When the battery is marching in column at a walk, to form it into line at a trot, gaining ground to the left, and continue the march, the captain commands :

1. *Form line advancing, left oblique, trot.* 2. MARCH. 3. *Guide right.*

The chief of the leading section repeats the command for the guide, and his section continues to move at a walk.

At the first command, the chiefs of the other sections command, *section, left oblique, trot*. The command *march* is repeated by the same chiefs; and when the oblique movement is commenced, they repeat the command, *guide right*. Each chief commands *forward*, as soon as his section has obliques sufficiently to the left, and *walk*, in time to command *march*, as it arrives on the line.

When the battery is marching in column at a trot, the movement is executed according to the same principle. In this case the captain does not command *trot*; and the chief of the leading section commands *walk, march*, successively, after the first and second commands of the captain. The chiefs of the other sections give the same commands as their sections arrive on the line.

The movement is executed so as to gain ground to the right, according to the same principles and by inverse means.

To form double column on the centre section.

695. The battery being in line at a halt, to form double column on the centre section, the captain commands :

1. *Double column on the centre.* 2. MARCH. 3. *Guide right*
(or left).

At the first command, the chief of the centre section commands, *section, forward*; the chief of the right section, *section, left oblique*; and the chief of the left section, *section, right oblique*. At the command *march*, repeated by the chief of the centre section, that section marches to the front, and its chief repeats the command for the guide.

When the wheel horses in the rear rank of the centre section have passed the leaders in the front rank of the other sections, the chiefs of those sections repeat the command *march*, and the sections commence the oblique.

When the piece nearest the column is about entering it, in each of these sections, the chief of the right section commands, *by the left, break section, march*; and the chief of the left, *by the right, break section, march*. The right and left sections, without change of gait, then form into columns of pieces in rear of the right and left carriages of the centre section.

The chiefs of the flank sections are careful to make their pieces enter the column at the proper time. And when the column is formed they place themselves outside of it, four yards from the centres of their respective sections.

The chief of the line of caissons follows the movement, sees that his carriages do not enter the column too soon, and, when the column is formed, places himself four yards in rear of the centre.

When the battery is marching at a walk, to form the double column at the same gait, the captain commands:

1. *Double column on the centre.* 2. MARCH. 3. *Guide right*
(or left).

The chief of the centre section repeats the command for the guide, and the section continues to advance.

At the command *march*, the other sections are halted by the command, *section, halt*, from their chiefs. They are afterward formed into column by the commands and means prescribed for forming double column from a halt.

When the battery is marching at a trot, the double column is formed according to the same principle. In this case the flank section pass to a walk, instead of halting as before, and resume the trot to oblique, and enter the column. The commands from their chiefs are, *walk; march; section, left (or right) oblique, trot; march*, and, *by the left (or right), break section; march*.

When the battery is marching at a walk, to form the double column at a trot, the captain commands:

1. *Double column on the centre, trot.* 2. MARCH. 3. *Guide right (or left).*

At the first command, the chief of the centre section commands *trot*. At the second, which he repeats, the section moves forward at a moderate trot, and he repeats the command for the guide.

The flank sections continue to walk until the centre has advanced sufficiently to allow them to oblique, and are then formed into column as already prescribed; their chiefs commanding, *section, left (or right) oblique, trot; march*, and, *by the left (or right), break section; march*.

To form the double column with a battery of four pieces, the captain gives the same commands as with a battery of six. The right section is broken into column of pieces by the left, and the left section by the right. The chiefs of sections place themselves on the outer flanks of the column, abreast the leading drivers of the leading carriages. The senior chief repeats the command for the guide, and gives such other commands as are required for the head of the column; the leading carriages moving as a section for the time being.

To deploy the double column into line to the front.

The battery being in double column at a halt, to form it into line to the front, the captain commands:

1. *Forward, into line.* 2. MARCH. 3. FRONT.

At the first command, the chief of the centre section commands, *section, forward*; the chief of the right section, *section, into line, right oblique*; and the chief of the left section, *section, into line, left ob-*

lique. At the command *march*, repeated by these chiefs, the centre section advances five yards, and its chief commands, *section, halt; right (or left)—dress.*

The flank sections oblique to the right and left; and as their pieces arrive in rear of their proper places on the line, they move forward, halt, and dress toward the centre without command.

As soon as the battery is aligned, the captain commands *front.*

When the column is marching, the movement is executed in the same manner. In this case the chief of the centre section does not command, *section, forward; march;* but halts and aligns his section after advancing five yards.

When the column is marching at a trot, to deploy it into line to the front at the same gait, without discontinuing the march, the captain commands:

1. *Form line advancing.* 2. MARCH. 3. *Guide right (or left.)*

At the first command, the chief of the centre section commands, *walk;* the chief of the right section, *section, into line, right oblique;* and the chief of the left section, *section, into line, left oblique.* At the command *march*, repeated by these chiefs, the centre section slackens its gait to a walk, and the flank sections deploy. As each piece arrives upon the line, its gait is changed to a walk without command. The movement is executed as in the preceding cases; but when the line is formed it continues to advance; the captain commanding *guide right (or left,)* which command is repeated by the chiefs of sections.

When the column is marching at a walk, to deploy it into line to the front at a trot, without discontinuing the march, the captain commands:

1. *Form line advancing, trot.* 2. MARCH. 3. *Guide right (or left.)*

At the first command the chief of the right section commands, *section, into line, right oblique, trot;* and the chief of the left section, *section, into line, left oblique, trot.* At the command *march*, repeated by these chiefs, the flank sections deploy at a trot; the centre sec-

tion continues to march at a walk; and, the line having been formed as in the preceding case, the captain gives the command or the guide.

When the battery consists of four pieces, the double column is deployed into line to the front by the same commands from the captain as when it consists of six. The chiefs of sections give the same commands as in the other case, and then their sections are formed as in No. 674. When the line is to be halted, as in forming *forward into line*, the senior chief commands, *halt; right (or left) dress*, as soon as the leading carriages have advanced five yards; and the alignment is made upon the central carriages.

To form the double column into line to the right or left.

697. The battery being in double column at a halt, to form it into line on the right, the captain commands :

1. *To and on the right into line.* 2. MARCH. 3. FRONT.

At the first command, the chief of the leading section commands, *section, right wheel*; and the other chiefs of sections, *forward*. At the second, repeated by those chiefs, the leading section wheels to the right and is established on the line as in No. 687. The other pieces advance under the direction of their chiefs and of the chiefs of sections, wheel to the right in succession as they arrive opposite their places, establish themselves on the line, and dress upon the pieces already aligned. When the alignment is completed, the captain commands *front*.

When the column is marching, the line is formed to the right in the same manner, except that the chiefs of the flank sections omit the commands, *forward, march*. The line is formed to the left according to the same principles and by inverse means.

When the battery consists of four pieces, the double column is deployed into line to the right or left by the same commands from the captain, as when it consists of six. In this case the leading pieces are wheeled to the right or left, as a section, and established on the line. For this purpose the senior chief of section commands, *right (or left) wheel; march; forward; guide right (or left); halt; right (or left) dress*. The other pieces move forward, wheel

in succession as they arrive opposite their places, and form on the line as already described.

To advance in line.

698. The battery being in line at a halt, to cause it to advance, the captain indicates to the guide the points on which he is to march, and commands:

1. *Battery, forward.* 2. MARCH. 3. *Guide right (or left.)*

The commands, *forward*; *march*; *guide right (or left)*, are repeated by the chiefs of sections. At the command *march*, all the carriages move forward at a walk, and the chiefs of sections preserve the alignment toward that chief of carriage who serves as *guide of the line*. The guide marches steadily in the given direction, and the chiefs of carriages regulate their intervals and alignment by him.

The carriages of the rear rank follow those in front at their appropriate distance of two yards. The chief of the line of caissons superintends the march of the rear rank of carriages, and moves wherever his presence may be necessary for that purpose.

In *horse artillery* the detachments preserve their alignments, and follow their pieces at the proper distance.

To halt the battery and align it.

699. When the battery is marching in line, to halt and align it, the captain commands:

1. *Battery—HALT.* 2. *Right (or left)—DRESS.* 3. FRONT.

The commands, *halt*; *right (or left)—dress*, are repeated by the chiefs of sections. At the first command, the carriages and detachments halt, and at the second align themselves by the right (or left) in their respective ranks; the carriages dressing by the drivers of their wheel horses. The carriages are placed as squarely on the line as possible without opening or closing the intervals. The captain superintends the alignment of the front rank of carriages, and

the chief of the line of caissons that of the rear; each placing himself for that purpose on the flank of the guide. When the battery is aligned, the captain commands *front*.

When the battery is halted, if it cannot be aligned by slight movements, the captain causes one or two carriages from one of the flanks or centre to advance four yards, or to a greater distance if necessary, and then causes the alignment to be made by the right, left, or centre, by the command, *right*, *left*, or, *on the centre, dress*. At this command, the carriages and detachments move forward and align themselves according to the principles just explained; the drivers halting a little in rear of the line, and dressing forward so as to place the carriage as squarely upon it as possible.

To change direction in line.

700. The battery being in line at a halt, to wheel it to the right, the captain commands :

1. *Battery, right wheel.* 2. *MARCH.* 3. *FORWARD.* 4. *Battery—HALT.* 5. *Right—DRESS.* 6. *FRONT.*

The commands, *right wheel*; *march*; *forward*; *halt*; *right—dress*, are repeated by the chiefs of sections.

At the command *march*, the pivot carriage moves at a walk, and describes a quadrant (twenty-two yards) of a circle, whose radius is fourteen yards. The other carriages move at a trot and preserve their intervals from the pivot. They regulate their gaits according to their distances from the pivot, so as to remain as short a time as possible in rear of the line, without urging their horses injuriously, and so as to arrive upon it in succession. The carriages of the rear rank follow at the proper distance in the tracks of those in front.

At the command *forward*, which is given when the leading pivot carriage has described its arc of twenty-two yards, that carriage moves direct to the front; and when the rear pivot carriage is in the new direction, the captain commands, *battery*; *halt*; *right dress*. The commands *forward*; *halt*; *right dress*, are repeated by the chief of the right section immediately after the captain; and by

the other chiefs in time to be applicable to their sections; the pivot carriages halting at the command *halt*, and the others halting and dressing toward the pivot as they arrive in succession on the line.

When the battery is aligned, the captain commands *front*.

The battery is wheeled to the left according to the same principles and by inverse means.

When the battery is at a halt or marching in line, to wheel it to the right and continue the march, the captain commands:

1. *Battery, right wheel.* 2. MARCH. 3. FORWARD.

The movement is executed as already described, except that the pivot carriage, after wheeling, continues to march in the new direction, and the others conform to its gait and direction as they arrive on the line.

The direction is changed to the left according to the same principles and by inverse means.

FORMATIONS IN BATTERY.

In line with pieces in front to form in battery to the front.

791. When the battery is in line at a halt, with the pieces in front, to form in battery to the front, the captain commands:

1. IN BATTERY. 2. *Guide left.* 3. MARCH.

These commands are repeated by the chiefs of sections. At the command *in battery*, the caissons stand fast, and the pieces advance. The intervals and alignment are preserved, and the chiefs of pieces and sections march at their places in line. At the command *march*, which is given as soon as they have advanced seventeen yards, the chiefs of pieces and sections halt, and the pieces execute an about. As soon as the about is completed, the pieces are halted, unlimbered, and prepared for firing; the limbers being taken to their places in battery by an about.

When the cannoneers are marching by the sides of their pieces, they halt at the command *march*, allow their pieces to pass them,

change sides, and move forward to the posts they are to occupy, when their pieces have completed the about. They are not required to observe any particular order during this movement.

When the cannoneers are mounted on the ammunition chest, those on the caissons dismount and run to their posts at the command *in battery*. Those on the pieces dismount after the about.

The chiefs of pieces and sections take their posts in battery as soon as the formation is completed.

In *horse artillery*, the movement is executed in the same manner, and by the same commands. But the pieces advance only ten yards before executing the about. The horses of the detachments do not advance. But at the command *in battery*, the cannoneers dismount and run to their posts.

After the formation, the captain rectifies the alignment, if necessary.

When the battery is marching in line with the pieces in front, it is formed in battery to the front, according to the same principles, and by the commands, *in battery, march*. The caissons halt at the command *in battery*; and in horse artillery the detachments do the same; the cannoneers dismounting and running to their posts.

To form in battery to the front by throwing the caissons to the rear.

702. When the battery is in line at a halt, with the pieces in front, to form in battery to the front by throwing the caissons to the rear, the captain commands:

ACTION FRONT.

At this command, repeated by the chiefs of sections, the pieces are unlimbered and wheeled about by hand; the limbers reversing to the left at the same time, and taking their places in battery, as described in the school of the piece, No. 658. The caissons reverse to the left, move to the rear, reverse again to the left, and take their places in battery.

When the cannoneers are mounted on the ammunition chests, they dismount and run to their posts, at the command *action front*.

In *horse artillery*, when this mode of coming into action is resorted

to, the detachments move to the posts belonging to their horses in battery, before dismounting, except when the number of horses is so small, that they may be led to the rear by the horse holders. In this case the captain commands *dismount*; immediately after, *action front*. When the detachments conduct their horses to the rear, they dismount without command from the captain.

The battery is generally in line at a halt, when this mode of coming into action is resorted to. It may also be used in successive formations by giving the command *action front*, when a part of the battery has been halted on the line. But with bad ground or heavy pieces this mode of coming into action should not be used.

In line with caissons in front, to form in battery to the front.

703. When the battery is in line at a halt, with the caissons in front, to form in battery to the front, the captain commands:

1. *Pieces, pass your caissons.* 2. MARCH. 3. IN BATTERY.
4. *Guide left.* 5. MARCH.

These commands are repeated by the chiefs of sections; the pieces pass their caissons, and at the command *in battery*, given as soon as the pieces have passed their caissons, the formation is executed as prescribed in No. 702.

In *horse artillery*, the command *in battery* is given when the detachments have passed the caissons.

When the battery is marching in line, with the caissons in front, it is formed in battery to the front according to the same principles, and by the commands, *pieces, pass your caissons* (or *pieces, pass your caissons, trot*); *march*; *in battery*; *guide left, march*.

In line with pieces in front, to form in battery to the rear.

704. When the battery is in line at a halt, with the pieces in front, to form in battery to the rear, the captain commands:

1. *Fire to the rear.* 2. *Caissons, pass your pieces, trot.*
3. MARCH. 4. IN BATTERY.

The three last commands are repeated by the chiefs of sections.

At the third, the caissons pass their pieces at a brisk trot. And, at the fourth, which is given as soon as the caissons have passed, the cannoneers unlimber and prepare for firing.

The caissons advance seventeen yards beyond their pieces, execute an about together, and take their places in battery.

When the cannoneers are mounted on the ammunition chests, the caissons advance seventeen yards beyond their pieces, and then halt to allow the cannoneers to dismount before executing the about. As soon as the caissons halt, the cannoneers dismount and run to their posts. When the battery is at a halt, as in the present case, it is considered better to dismount the cannoneers before commencing the movement. The chief of the line of caissons precedes the movement of his carriages, and places himself on the line to be occupied by their leaders, when the about is commenced. He takes his place in battery as soon as the about is completed and the carriages are on the line.

The chiefs of pieces and sections take their places in battery as soon as the formation is completed.

In *horse artillery*, at the command *in battery*, the detachments incline to the right, pass their pieces at a brisk trot, and take their places in battery by a left about. The cannoneers then dismount, run to their posts, unlimber, and prepare for firing.

When the battery is marching in line, with the pieces in front, the formation in battery to the rear is executed according to the same principles and by the same commands. At the command *in battery*, which is given as soon as the caissons have passed their pieces, the latter halt, the detachments in horse artillery pass them, and the movement is completed as already described.

In line with caissons in front, to form in battery to the rear.

705. When the battery is in line at a halt, with the caissons in front, to form in battery to the rear, the captain commands:

1. *Fire to the rear.* 2. IN BATTERY.

At the command *in battery*, which is repeated by the chiefs of sections, the cannoneers unlimber and prepare for firing.

The chiefs of pieces and sections take their places in battery.

The caissons move at a brisk trot and take their places in battery, under the superintendence of their chief.

In *horse artillery*, at the command *in battery*, the detachments pass their pieces at a trot, move to their places in battery, dismount, and run to their posts.

When the battery is marching in line, with the caissons in front, the formation in battery to the rear is executed according to the same principles and by the same commands.

In battery, to form in line to the front.

706. Being in battery, to form in line to the front with the caissons in rear, the captain commands:

LIMBER TO THE FRONT.

This command is repeated by the chiefs of sections, and the pieces are limbered as described in No. 648; the caissons closing at the same time to the proper distance without further command.

When the captain wishes to place the caissons in front, he commands, *limber to the front*; and while the pieces are limbering, *caissons, pass your pieces, trot; march*. The caissons pass and halt in front of their pieces; or, if the captain wishes the battery to advance, he commands *forward; guide right (or left)*, as the caissons are completing the passage, and the battery moves forward at a walk.

In *horse artillery*, when the pieces are limbered to the front, the horse holders advance within two yards of their pieces; and there the cannoneers mount.

The captain rectifies the alignment, if necessary, and commands *front*.

When the battery is to advance immediately, the captain commands, *forward; guide right (or left)*, instead of *battery, halt*; and the caisson, close on the march.

When the captain wishes to place the caissons in front, he may cause the pieces to be limbered to the rear, and command:

1. *Caissons pass your pieces, trot, pieces left about.* 2. **MARCH.**
3. *Battery—HALT, or FORWARD—Guide right (or left).*

These commands are repeated and executed as already prescribed; the pieces executing the about as soon as the ground has been unmasked by the caissons, and the battery halting or advancing as soon as the passage is completed.

In *horse artillery*, when the pieces are limbered to the rear, the cannoneers run to their horses, mount, and rejoin their pieces.

In battery, to form in line to the rear.

707. When in battery, to form in line to the rear, the captain causes the pieces to be limbered to the rear; and then, if he wishes to place the caissons in front, commands:

1. *Caissons, left about; pieces, forward.* 2. MARCH. 3. *Battery—HALT, or FORWARD—Guide right (or left.)*

The two first commands are repeated by the chiefs of sections; the caissons execute the about; and the pieces close to their proper distance. The third command, which is given at the moment the about is finished, is repeated and executed as prescribed.

The captain rectifies the alignment if necessary, and commands *front*.

In *horse artillery*, the detachments oblique to the left to facilitate the movement of the caissons. And then if the battery halts, they place themselves at once in rear of their pieces; or if it advances, they wait and do the same by wheeling to the right as they pass.

If the formation in line to the rear is to be executed by placing the pieces in front, the captain, after causing the pieces to be limbered to the rear, commands:

1. *Pieces, pass your caissons; caissons, left about.* 2. MARCH. 3. *Battery—HALT, or FORWARD—Guide right (or left.)*

The first two commands are repeated by the chiefs of sections; the pieces pass their caissons; and the caissons execute the about as soon as the ground is unmasked. The third command is repeated and executed according to the principles prescribed in No. 698.

The captain rectifies the alignment if necessary, and commands *front*.

In *horse artillery*, the detachments place themselves behind their pieces as soon as they are passed by them.

In forming line to the rear, either with pieces or caissons in front, the caissons may be placed at once in front of their pieces for greater convenience in mounting the cannoneers. For this purpose, as soon as the captain has commanded, *limber to the rear*, he commands:

1. *Caissons, in front of your pieces (or caissons, in front of your pieces, trot.)* 2. MARCH.

These commands are repeated by the chiefs of sections; and while the pieces are limbering, the caissons oblique to the right, move forward near the middle of the interval between the leaders of the pieces, place themselves in front of them by two successive wheels to the left, and halt.

In *horse artillery*, when the caissons are ordered to the front of their pieces, the horse holders oblique to the left at the command *march*, and halt between the leading drivers of the pieces. As soon as the cannoneers are mounted, the detachments take their posts in rear of their pieces.

In column with pieces in front, to form in battery to the front.

708. When the battery is in column at a halt, with the pieces in front, to form in battery to the front by gaining ground to the left, the captain commands:

1. *Forward, into battery, left oblique.* 2. MARCH. 3. *Guide right.*

At the first command, the chief of the leading section commands, *section, forward*; and those of the other sections, *section, left oblique*. The chief of the line of caissons moves quickly to the right of the leading section, to cause the caissons to halt at the proper time and to superintend their alignment. At the command *march*, repeated by the chiefs of sections, the movement is executed as prescribed in No. 685, for forming line to the front. But as each section arrives on the line, instead of halting, its chief forms it in battery to

the front by the commands, *in battery; march*, which are executed as prescribed in No. 701.

The formation in battery to the front, by gaining ground to the right, is executed according to the same principles and by inverse means.

When the battery is marching in column, it is formed in battery to the front by applying the principles of No. 701.

In column, with caissons in front, to form in battery to the front.

709. When the battery is in column at a halt, with the caissons in front, to form in battery to the front by gaining ground to the left, the captain commands:

1. *Forward, into battery, left oblique.* 2. MARCH. 3. *Guide right.*

At the first command, the chief of the leading section commands, *section, forward*; and those of the other sections, *section, left oblique*. The chief of the line of caissons moves quickly to the right of the leading section, to halt the caissons at the proper time and to superintend their alignment. At the command *march*, repeated by the chiefs of sections, the movement is executed as prescribed in No. 701, for forming line to the front. But as each section arrives on the line, instead of halting, its chief forms it in battery to the front by the commands, *pieces, pass your caissons; march; in battery; march*, which will be executed as prescribed in No. 703.

The formation in battery to the front, by gaining ground to the right, is executed according to the same principles and by inverse means.

When the battery is marching in column, it is formed in battery to the front by applying the principles laid down in the latter part of No. 703.

In column, with pieces in front, to form in battery to the rear.

710. When the battery is in column at a halt, with the pieces in

front, to form in battery to the rear by gaining ground to the left, the captain commands:

1. *Into battery, faced to the rear, left oblique.* 2. MARCH.
3. *Guide right.*

At the first command, the chief of the leading section commands, *section, forward*; and those of the other sections, *section, left oblique*. The chief of the line of caissons goes to the right of the leading section, to direct the about of the caissons, and to superintend their alignment. At the command *march*, repeated by the chiefs of sections, the movement is executed as prescribed in No. 685, for forming line to the front. But as each section arrives on the line, instead of halting, its chief forms it in battery to the rear by the commands, *caissons, pass your pieces, trot; march; in battery*, which are executed as prescribed in No. 704.

The formation in battery to the rear, by gaining ground to the right, is executed according to the same principles and by inverse means.

When the battery is marching in column, it is formed into battery to the rear by applying the principles prescribed in the latter part of Nos. 685 and 704.

In column, with caissons in front, to form in battery to the rear.

711. The battery being in column at a halt, with the caissons in front, to form in battery to the rear by gaining ground to the left, the captain commands:

1. *Into battery, faced to the rear, left oblique.* 2. MARCH.
3. *Guide right.*

At the first command, the chief of the leading section commands, *section, forward*; and those of the other sections, *section, left oblique*. The chief of the line of caissons goes to the right of the leading section, to direct the about of the caissons, and to superintend their alignment. At the command *march*, repeated by the chiefs of sections, the movement is executed as prescribed in No. 685 for form-

ing line to the front. But as each section arrives on the line, instead of halting, its chief forms it into battery to the rear by the command *in battery*, which is executed as prescribed in No. 704.

The formation in battery to the rear, by gaining ground to the right, is executed according to the same principles and by inverse means.

When the battery is marching in column, it is formed into battery to the rear by applying the principles of Nos. 685 and 754.

In column, with pieces in front, to form into battery to the right or left.

712. When the battery is in column, in march, or at a halt, with the pieces in front, if the captain wishes to form it in battery to the left, by gaining ground to the right, he commands :

1. *Fire to the left, by section, right wheel.* 2. MARCH. 3. *Caissons, pass your pieces, trot.* 4. MARCH. 5. IN BATTERY.

At the first command, the chiefs of sections command, *section, right wheel* ; and at the second, which they repeat, all the sections wheel to the right. The caissons follow their pieces at the proper distance.

At the commands, *caissons, pass your pieces, trot ; march*, which are given before the completion of the wheel, and repeated by the chiefs of sections, all the caissons pass the pieces at a trot.

At the command *in battery*, which is given and repeated in like manner as soon as the caissons have passed, and the pieces are square on the new line, all the sections form at once into battery to the rear, as prescribed in No. 704.

When the captain wishes to form in battery to the left, by gaining ground to the left, he commands :

1. *Fire to the left, by section, left wheel.* 2. MARCH. 3. IN BATTERY. 4. MARCH.

At the first command, the chiefs of sections command, *section, left wheel* ; and at the second, while they repeat, all the sections wheel at once to the left.

At the command *in battery*, which is given and repeated as soon as the caissons have completed the wheel, all the sections form at once into battery to the front, as prescribed in No. 703.

The two formations in battery to the right, by gaining ground to the left or right, are executed according to the same principles and by inverse means.

In column, with caissons in front, to form in battery to the right or left.

713. When the battery is in column, in march or at a halt, with the caissons in front, to form it in battery to the left, by gaining ground to the right, the captain commands :

1. *Fire to the left, by section, right wheel.* 2. MARCH. 3. IN BATTERY.

At the first command, the chiefs of sections command, *section, right wheel* ; and at the second, which they repeat, the sections wheel at once to the right, and move to the front at the commands, *forward, guide right*, from their chiefs.

At the command *in battery*, which is given and repeated as soon as the pieces are square on the new line, all the sections form at once into battery to the rear, as prescribed in No. 704.

To form in battery to the left, by gaining ground to the left, the captain commands :

1. *Fire to the left, by section, left wheel.* 2. MARCH. 3. *Pieces, pass your caissons.* 4. MARCH. 5. IN BATTERY. 6. MARCH.

At the first command, the chiefs of sections command, *section, left wheel* ; and at the second, which they repeat, the sections wheel at once to the left. The third and fourth commands are given and repeated just before the completion of the wheel ; and the fifth is given when the pieces have passed their caissons, and the latter are square upon the new line. The sections are then formed in battery to the front as prescribed in No. 703.

The formations in battery to the right, by gaining ground to the

right or left, are executed according to the same principles and by inverse means.

In column, with pieces in front, to form in battery on the right or left.

714. When the battery is marching in column, with the pieces in front, to form in battery on the right, the captain commands :

1. *On the right, into battery.* 2. MARCH. 3. *Guide right.*

At the first command, the chief of the leading section commands, *section, right wheel* ; and the chief of the line of caissons goes to that section. At the command *march*, repeated by the chief of the leading section, that section wheels to the right, and its chief conducts it to the line by the commands, *forward, guide right*. And then, without halting, it is formed into battery to the front, as prescribed in No. 703, by the commands, *in battery, march*, from its chief.

The other sections continue to advance ; and as each arrives opposite its place in battery, after passing the one preceding it in the formation, it is formed into battery by its chief, by the commands, *section, right wheel ; march ; forward ; guide right ; in battery ; march* ; the command *in battery* being given as the caissons arrive in line with those already established.

The formation in battery on the left is executed according to the same principles and by inverse means.

When the battery is in column at a halt, it is formed in battery on the right or left according to the same principles. In this case, the chiefs of the two rear sections command, *section, forward*, immediately after the first command of the captain, and then repeat the commands, *march ; guide right (or left)*.

In column, with caissons in front, to form in battery on the right or left.

715. When the battery is marching in column, with the caissons in front, to form in battery on the right, the captain commands :

1. *On the right, into battery.* 2. MARCH. 3. *Guide right.*

At the first command, the chief of the leading section commands, *section, right wheel*; and the chief of the line of caissons goes to that section. At the command *march*, repeated by the chief of the leading section, that section wheels to the right, and is conducted to the line by the commands, *forward, guide right*, from its chief, as soon as it reaches the line, the section is formed in battery to the front by the commands, *pieces, pass your caissons; march; in battery; march*, from its chief.

The other sections continue to advance, and as each arrives opposite its place in battery, after having passed the one preceding it in the formation, it is wheeled to the right, and formed into battery by its chief, in the same manner as the leading section.

The formation in battery on the left, is executed according to the same principles and by inverse means.

When the battery is in column at a halt, it is formed in battery on the right or left, according to the same principles; the chiefs of the two rear sections giving the additional commands prescribed in No. 714.

To deploy the double column into battery to the front or rear.

716. The battery being in double column at a halt, to deploy it into battery to the front, the captain commands:

1. *Forward into battery.* 2. MARCH.

At the first command, the chief of the centre section commands, *section, forward*; that of the right, *section into line, right oblique*; that of the left, *section into line, left oblique*; and the chief of the line of caissons goes to the leading section. At the command *march*, repeated by the chiefs of sections, the centre section advances five yards, and without halting, is formed into battery to the front as prescribed in No. 701 or 703, according to the kind of carriage in front.

The pieces of the flank sections are brought upon the line by obliquing, and placed successively in battery without command; regulating by the centre section.

When the battery is marching in double column, it is deployed into battery to the front in the same manner, except that the chief of the centre section does not command, *section, forward ; march.*

When the battery is in double column, marching or at a halt, it is deployed into battery to the rear according to the principles prescribed in this No. and in No. 704 or 705, according to the kind of carriage in front. The commands are :

1. *Into battery, faced to the rear.* 2. MARCH.

When the battery consists of four pieces, the double column is deployed into battery to the front or rear, by the same commands from the captain as when it consists of six. The sections are formed into battery as prescribed for the flank sections in this number. The senior chief of section, besides superintending the formation of his own, gives the commands required for the centre section, and the leading pieces conform to the movements of that section.

To deploy the double column into battery to the right or left.

717. When the battery is in double column, marching or at a halt, to form it in battery to the right, the captain commands :

1. *To and on the right, into battery.* 2. MARCH.

The centre section is formed in battery on the right, as prescribed for the leading section in No. 712 or 713, according to the kind of carriage in front.

The other pieces are brought into line as prescribed in No. 697, and, without halting, are formed successively in battery to the front without commands ; regulating by the centre section.

The deployment into battery to the left is executed according to the same principles and by inverse means.

When the battery consists of four pieces, the double column is deployed into battery to the right or left, by the same commands from the captain as when it consists of six. In this case the leading pieces are wheeled to the right or left as a section, and conducted to the line by the senior chief of section. And then, without halting, they are formed into battery to the front by the same chief. The other pieces move forward, wheel in succession as they

arrive opposite their places, and form in battery on the alignment of those already established.

To pass from the order in battery to the order in column.

718. Being in battery, to form column, the captain first causes the line to be formed as prescribed in Nos. 706 or 707, and then forms column by one of the manœuvres for passing from the order in line to the order in column.

FIRINGS.

719. When everything is prepared for firing, the captain commands:

COMMENCE FIRING.

This command, given by itself or after *load*, is repeated by the chiefs of sections; and the firing immediately commenced.

The firing is discontinued by the command or signal, *cease firing*, which is repeated by the chiefs of sections and pieces.

When the battery is formed for action, the pieces are not loaded until the command *load* or *commence firing* is given by the captain. In successive formations, when this command is given, it is repeated in succession by the chiefs of sections, as their sections are formed on the line.

At the command *cease firing*, such pieces as are loaded must be discharged.

To fire advancing.

720. When the battery is firing, to advance by half batteries, the captain commands:

1. *Fire advancing, by half battery.* 2. *Right half battery—*
ADVANCE.

At the second command, the chief of the right half battery discontinues firing, causes his pieces to be limbered to the front, and

commands; *forward, march; guide left*. Or, he may cause them to be limbered to the rear, and after executing the about, command, *forward, guide left*. The half battery advances, and the caissons preserve their distance in battery.

As soon as the right half battery reaches the new position, previously indicated by the captain, its chief places it in battery, by the commands, *halt; action, front; or in battery; march*; the two last commands being given in quick succession. The caissons halt at these commands; and as soon as the pieces are unlimbered, the firing is renewed by command from the chief of half battery.

The fire of the left half battery is continued during the movement of the right, care being taken to direct the pieces so that their fire shall not injure the half battery in advance.

As soon as the right half battery commences firing, the left moves forward with the guide to the right; and, after passing the right half battery as far as the latter has advanced, is formed into battery and the firing commenced. The movements of the left half battery are effected by commands and means corresponding to those of the right.

The right half battery again advances as soon as the left commences firing; and the two continue to advance alternately until the captain causes the firing to cease. The battery is then aligned, or formed into line, to the front or rear, by the proper commands from the captain.

While advancing by half battery, the captain places himself habitually with the most advanced portion of the battery, and is accompanied by the chief of the centre section. The chief of the line of caissons remains habitually with the rear half battery.

In *horse artillery*, while advancing by half battery, the detachments preserve their distance in battery. When the pieces are limbered to the front, the horse-holders advance to enable the cannoneers to mount more readily; but as soon as the pieces advance, the detachments resume their distance in battery.

To fire advancing by half battery, commencing with the left, is executed according to the same principles and by inverse means.

The movement may also be executed by sections; the sections advancing in succession, according to their positions in the battery.

To fire in retreat.

721. When the battery is firing, to retire by half batteries, the captain commands:

1. *Fire retiring, by half battery.* 2. *Right half battery—*
RETIRE.

At the second command, the chief of the right half battery discontinues firing, limbers to the rear, and commands, *caissons, left about, march.* As soon as the about is completed, he commands, *forward, guide right*; and conducts the half battery to the ground previously indicated by the captain; the pieces preserving their distance in battery by marching nineteen yards in rear of the caissons. As soon as the ground has been reached, the chief of the half battery commands, *halt; in battery*, and commences firing; taking care not to injure the other half battery. The limbers and caissons remain facing toward the rear, as long as the firing in retreat continues.

As soon as the right half battery commences firing, the left retires with the guide to the left; and, after passing the right half battery as far as the latter has retired, it is formed into battery, and the firing again commenced. The movements are executed in a manner corresponding to those of the other half battery.

The half batteries continue to retire alternately, until the captain causes the firing to cease. The battery is afterwards aligned, or formed into line to the front or rear, by appropriate commands from the captain.

While retiring by half battery, the captain remains habitually with the portion of the battery nearest the enemy, and is accompanied by the chief of the centre section. The chief of the line of caissons accompanied the other half battery.

In *horse artillery*, the detachments move to the left to facilitate the about of the caissons. They afterward place themselves behind and follow them during the retrograde movement at the distance of two yards; remaining faced to the rear as long as the firing in retreat continues.

To fire retiring by half battery, commencing with the left, is executed according to the same principles and by inverse means.

The movement may also be executed by sections; the sections retiring in succession according to their position in the battery.

Movements for firing in echelon.

722. When the battery is in line at a halt with pieces in front, to advance in echelon of pieces, the captain commands:

1. *By piece from the right, front into echelon.* 2. MARCH.

At the first command, the right piece moves forward, followed by its caisson. The next piece moves forward in like manner as soon as its leaders are abreast the wheel horses of the rear carriage on the right; and the other pieces commence the movement in succession according to the same rule.

The officers preserve the same relative positions as in line.

When the battery is marching in line at a walk or trot, the echelon is formed according to the same principles and by the same commands; the gaits being regulated as in breaking sections.

The battery advances in echelon of pieces from the left according to the same principles and by inverse means.

When the caissons are in front, the battery advances in echelon of pieces from the right or left according to the same principles and by the same commands.

When the battery is in echelon, marching or at a halt, it may be formed into battery to the front, rear, right or left.

When firing in echelon to the front or rear, the direction of the fire may be changed to the right or left. For this purpose the captain orders the firing to cease, and commands, *action, right* (or *left*). At this command, the trails of the pieces are turned to the left (or right), and the limbers and caissons take their places in rear of the pieces. But if retiring with the prolonge fixed, the caissons stand fast, and the limbers back to allow the trails to be turned in the proper direction. The prolonge must be sufficiently slack to allow the recoil of the guns. This last method is only applicable to firing to the right when retiring by the right, and to the left when retiring by the left.

To fire to the rear.

723. When the battery is firing, to fire to the rear, the captain causes the firing to cease, and commands:

1. *Fire to the rear.* 2. *Limbers and caissons, pass your pieces, trot.* 3. MARCH.

These commands are repeated by the chiefs of sections. At the command *march*, the pieces are wheeled about by turning the trails to the left; and the limbers and caissons oblique to the right, pass them, and take their places in battery by a left reverse.

In *horse artillery*, the horses follow their limbers, pass them, and take their places by wheeling about to the left.

CHANGES OF FRONT IN BATTERY.

Change of front to fire to the right, left wing forward, and the reverse.

724. When the battery is firing, if the captain wishes to make a perpendicular change of front, to fire to the right, throwing forward the left wing, he discontinues firing, and commands:

1. *Fire to the right.* 2. *Change front forward on the right piece.* 3. MARCH.

At the second command, the chief of the right section places the right piece in the new direction, by causing the trail to be moved to the left. He also causes the left piece of his section to be moved forward by hand, and established on the new line. When the ground is unmasked, the limbers and caissons of these pieces oblique to the left, move forward, and take their places in battery by wheeling to the right; the caissons aligning themselves by the chief of the line of caissons established on the right.

The other chiefs of sections cause their pieces to be limbered by

the command, *limber to the front*; the caissons, and in *horse artillery* the horse holders, also, closing upon the piece while they are limbering. As soon as they are limbered the chiefs of sections command *forward*.

At the second command, the chief of the line of caissons places himself on the left of the right piece of the centre section, facing to the front, to mark the right of the new line of caissons.

At the command *march*, repeated by the chiefs of the centre and left sections, these sections move to the front; and when each has arrived opposite its place on the new line, its chief commands—*section, right wheel; march; forward*; and afterward, *in battery, march*, so as to form upon the alignment of the right section. When the caisson of the right piece of the centre section reaches the point where its piece wheeled, it wheels to the left, takes its distance in rear, wheels about and dresses to the right upon the line of caissons.

The other caisson of the same section obliques to the left when its piece commences the wheel; and, after gaining its distance establishes itself on the line by wheeling and dressing to the right.

The pivot piece commences firing again, as soon as it is in position, and the others as they arrive on the line.

The change of front to fire to the left, right wing forward, is executed according to the same principles and by inverse means.

In *horse artillery*, the detachments follow their pieces and halt at their proper distance from the line. That of the left piece of the right section, when limbered, wheels to the left when its piece wheels to the right, allows its caisson to pass it, and takes its place by wheeling about to the left. The horse holders of the pieces not limbered oblique to the left, with their limbers, and, like them, take their places in battery by wheeling to the right. When it is deemed advisable, the captain may retain the cannoneers at their pieces, and allow all the horse holders to conduct their horses to the new line. The same may be done in the other changes of front.

Change of front to fire to the left, left wing forward, and the reverse.

725. When the battery is firing, if the captain wishes to make a

perpendicular change of front to fire to the left, throwing forward the left wing, he discontinues firing and commands:

1. *Fire to the left.*
2. *Change front forward on the right piece.*
3. MARCH.

At the second command, the chief of the right section causes the right piece to be placed in the new direction at once, by moving the trail to the right; and the limber and caisson of that piece will oblique to the right, and take their places in its rear by wheeling to the left; the caisson dressing upon the chief of the line of caissons. He also causes his left piece to be moved to its place and established on the line by hand; the limber of this piece, passing it on the right, takes its place by wheeling to the left, its caisson obliques to the right, passes on the right, and in rear of the right caisson, and takes its place also by wheeling to the left.

The chiefs of the other sections cause them to be limbered to the front; and while limbering they command—*caissons pass your pieces, trot; march.* When this is executed the chief of the centre section commands *section, right wheel,* and that of the left *forward.*

At the command *march*, repeated by the chiefs of the centre and left sections, these sections move as ordered, with the caissons leading. The centre section is conducted to the line by its chief and formed by the commands, *forward* and *in battery.* The left section advances five yards and is conducted to the line by two successive right half wheels. It is there formed in like manner upon the alignment of the right section.

At the second command from the captain, the chief of the line of caissons places himself in prolongation of the line, thirty-two yards on the right of the right piece, and faces to the front, to mark the left of the new line of caissons.

The pivot piece recommences firing as soon as it is unmasked; and the others when they arrive on the line.

The change of front to fire to the right, right wing forward, is executed according to the same principles and by inverse means.

In *horse artillery*, the horse holders of those pieces, which are

placed on the line by hand, conduct the horses to their positions in battery by following their limbers.

Change of front to fire to the left, left wing to the rear, and the reverse.

726. When the battery is firing, if the captain wishes to make a perpendicular change of front to fire to the left, throwing the left wing to the rear, he causes the firing to cease, and commands:

1. *Fire to the left.*
2. *Change front to the rear on the right piece.*
3. MARCH.

At the second command, the chief of the right section places the right piece in the new direction, by causing the trail to be moved to the right. He also causes the left piece of his section to be moved to the rear by hand, and established on the new line. The limbers and caissons of these pieces move at once to the right, obliquing sufficiently to place themselves in rear of their respective pieces, and take their places by wheeling to the left or left about.

The other chiefs of sections command, *limber to the rear*, and immediately afterward, *caissons in front of your pieces, trot; march*. The caissons place themselves in front of their pieces, while they are limbering, and halt as prescribed in No. 707. The chiefs of these sections then command *forward*.

The chief of the line of caissons places himself in the prolongation of the line, thirty-two yards on the right of the right piece, and faces to the rear to mark the right of the new line of caissons.

At the command *march*, given by the captain, and repeated by the chiefs of the centre and left sections, the chiefs of these sections command *guide left*, and afterward in succession, *section, left wheel; march; forward; in battery*. The carriages dress toward the pivot as they arrive on the line.

The pivot piece recommences firing as soon as it is unmasked; and the others when they arrive on the line.

The change of front to fire to the right, right wing to the rear, is executed according to the same principles and by inverse means.

In *horse artillery*, the detachments pass their pieces at the command *march*, place themselves two yards in rear of the muzzles, follow them, and, at the command *in battery*, take their places. The horse holders of those pieces which are moved by hand, follow their limbers and conduct the horses to their positions, by movements corresponding to those of their caissons. When the left piece of the right section is limbered, the horses of the detachment are conducted to their places in the same manner as though the piece were unlimbered, except that the detachment mounts.

Change of front to fire to the right, left wing to the rear, and the reverse.

727. When the battery is firing, if the captain wishes to make a perpendicular change of front to fire to the right, throwing the left wing to the rear, he discontinues firing and commands:

1. *Fire to the right.* 2. *Change front to the rear on the right piece.* 3. MARCH.

At the second command, the chief of the right section commands, *limbers and caissons, in rear of your pieces, trot; march.* The limbers and caissons oblique to the right, and pass their pieces with the limbers leading. As soon as the limbers have passed, they wheel twice to the left and cover their pieces. The caissons pass their limbers and cover them in like manner. The chief of the section causes the trail of his right piece to be moved to the left, and his left piece to be placed upon the new alignment by hand.

The chiefs of other sections command, *limber to the rear, and caissons in rear of your pieces, trot; march.* When this is executed they command *forward.*

At the second command, the chief of the line of caissons places himself on the left of the right piece of the centre section, facing to the rear, to mark the left of the new line of caissons.

At the command *march*, from the captain, repeated by the chiefs of the centre and left sections, those sections, as well as the lim-

bers and caissons of the first, are established upon the new line as described in No. 724.

The pivot piece recommences firing as soon as it is placed in the new direction; and the others as they arrive on the line.

The change of front to fire to the left, right wing to the rear, is executed according to the same principles and by inverse means.

In *horse artillery*, the mounted detachments pass their pieces with the caissons at the command *march*, and take their places in rear of the muzzles by successive wheels to the left. The horse holders of the pieces which are moved by hand follow their limbers and wheel into their places in like manner. The remainder is executed as in No. 724.

To pass a defile in front.

728. When the battery is firing, to pass a defile in front of the right section, the captain commands:

1. *To the front, by the right section, pass the defile.*

2. MARCH.

At the first command, the chief of the right section discontinues firing, limbers his pieces to the front, and commands *forward*. At the command *march*, repeated by this chief, who also commands *guide left*, the section moves forward, passes the defile, and is again established in battery, and the firing commenced by his command.

As soon as the right section commences firing, the centre is put in motion in like manner. Its chief conducts it through the defile by successive wheels, and forms it into battery in line with the first.

As soon as the centre section commences firing, the left passes in like manner.

While one section is passing the defile, the others continue firing; care being taken not to injure the section in advance.

When the defile is in front of the left section, it is passed according to the same principles, commencing with that section.

When the defile is in front of the centre section, it is passed according to the same principles, commencing with that section, and by the commands, *to the front, by the centre section, pass the defile; march.* Unless there is some reason to the contrary, the right section will pass before the left.

When the flank or oblique march is better suited to the nature of the ground, the chiefs of sections will give the required commands.

When the defile will admit but one piece at a time, the sections are broken by their chiefs in such a manner as to cause the nearest piece to enter first. The sections are re-formed by their chiefs immediately after passing the defile.

To pass a defile in rear.

729. When the battery is firing, to pass a defile in rear of the centre section, the captain commands:

1. *To the rear, by the right section, pass the defile.*

2. MARCH.

At the first command, the chief of the right section discontinues firing, limbers to the rear, and commands, *caissons, left about, pieces, forward.* At the command *march*, repeated by the chief of the right section, the caissons of that section execute the about, and the pieces close to their proper distance at a trot. As soon as the about is completed, the chief commands *forward, guide left*, conducts the section through the defile by successive wheels, and forms it into battery in rear of its first position.

The left section is put in motion as soon as the right commences firing. It is conducted through the defile by its chief, and formed into battery in rear of its first position, by the principles already described.

The centre section moves as soon as the left commences firing. It is formed into battery in rear of its first position, and in line with the other two sections.

The passage of the defile may be executed, commencing with the left section, according to the same principles, and by inverse means.

When the defile is in rear of one of the flanks, the movement should commence with the other. It should always end by passing the section or piece covering the defile.

When the defile will admit but one piece at a time, the sections are broken by their chiefs in such a manner as to cause the piece farthest from the defile to enter first; and the sections are again formed as soon as possible after leaving the defile.

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